

BENCH MARK STUDIES OF SOCIO-ECONOMIC
CONDITIONS OF THE DROUGHT PRONE
AREAS OF UTTAR PRADESH

AND
RAJASTHAN

242

(Sponsored by the Central Water Commission, New Delhi)

DISTRICT PROFILE : BARMER

A. JOSHI
YAMINUL HASSAN
S. D. RAI

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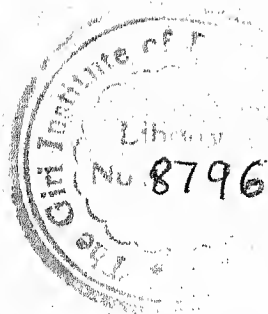
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PREFACE

This report has been prepared as a part of the research project 'Bench Mark Studies of Socio-Economic Conditions of Drought Prone Areas of Uttar Pradesh and Rajasthan', sponsored by the Central Water Commission, New Delhi. It aims at portraying the resource potential and economic structure of district Barmer with a view to identifying the major constraints and explaining possibilities of further development. Special stress has been laid on the potential and utilisation of water resources for the purpose of socio-economic development of the district. An attempt has been made, towards the end of the report, to suggest major possible directions for a strategy for development of the district.

The profile has been prepared with the overall direction and guidance of Dr. T.S. Papola, Dr. G.P. Mishra and Dr. R.T. Tewari, the project directors. Dr. G.P. Mishra went through the earlier drafts and suggested improvements for the finalisation of the report. The team of colleagues who undertook the task of collection of data used in this report consisted of Shri Kripal Singh Bisht, Shri Ashok Singh, Shri Sampat Raj Jain, Shri Prakash Chand, Shri Kailash Ch. Bothara and Shri Sarwan Kumar Chhangani. Our grateful thanks are due to the district officials, specially of the Directorate of Economics and Statistics, Jaipur, for providing necessary co-operation and access to the statistical data relating to Barmer. We are also thankful to Shri V.K. Arjunan Achary and Shri Subhashish Mukherjee, who handled the typing work very efficiently.

Lucknow
November 1983

A. JOSHI
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CHAPTER I

Physical Features

The district derives its name from the head quarter town of Barmer. Barmer district is said to have been founded in the 13th century by Bar Rao, and has been named after him. It was once a part of Jodhpur state. Which was divided into 24 Parganas. Four of these parganas and a part of the fifth are known as Barmer district today.

The administration of district consists of two sub-divisions Barmer and Balotra. Barmer sub-division has three tehsils; viz. Barmer, Shiv and Choblan while Balotra has two tehsils namely Pachpadra and Siwana. The area of the district is 28387 sq.kms., of which Barmer tehsil is largest with 40.77% of the total area under by it while Siwana tehsil with 9.22% of the district area is the smallest. Thus, the district is one of the largest districts in Rajasthan and ranks 2nd with respect to area and 17th in population. Barmer district is situated on the western region of the state and is bounded on the north by Jaisalmer and Jodhpur districts, on the east by Jodhpur, Palli and Jalor districts; on the south by Jalor. It also shares its border with Pakistan on the west. Barmer is located between 20°39' and 26°32' north latitudes and 70°5' and 72°52' east longitudes.

Besides a small offshoot of Aravalli hills on the east, the district is a vast sandy covered tract. Barmer district is a part of the great Indian desert - Thar. North and West parts of

Barmer town lie in the desert which also covers Sind and Jaisalmer. The highest elevation of hills, which occurs in the north, is 1139 MSL while the southern range attains 774.2 mts. above sea level.

Climate

The climate of Barmer is dry with extreme temperature and the nature of rainfall is erratic. There are four seasons in the year, the summer from April to June, the monsoon from July to mid September, post monsoon from mid September to October and the winter season from November to March.

In winter season, the night temperature often falls below freezing point. This drop of temperature in the night is rather sudden. But the day temperature is high in all seasons. The temperature rises rapidly from April and attains the highest degree in May and June. The day temperature reaches as high as 49°C in May. With the onset of the monsoon temperature starts declining in July but after the withdrawal of monsoon by September, the day temperature increase again. The normal annual relative humidity of Barmer ranges between 35% to 59%. Evapo-transpiration and evaporation are high in this district and varies from 239.4 mm. to 81.00 mm. in summer and winter months respectively.

Barmer is one among the district having a low level of rainfall. Average rainfall of the district is 266.69 mm. only. The district receives 91.7% of the normal annual rainfall from the south west monsoon from June to September, August is the

month of maximum rainfall followed by July. The highest annual rainfall of 795.5 mm. was recorded in 1944. Only 2% of the normal rainfall occurs during October to November and the balance of 6.3% is received during the months of December and January to May.

Soil and Soil Erosion

It is generally seen that the quality of the soil is very poor, Central Arid Zone Research Institute, Jodhpur classified the soils of the district as desert soils, sand dunes, red desertic soil, saline soils of depressions and Lithosols and Regosols of hills. Major part of the area of the district is occupied by desert soils and sand dunes.

In general, the soils of Barmer can be described as desertic. The north and west parts of the district lie in Thar desert. Apart from the small area of Aravalli hills in the eastern part, the area is largely sandy. There are four types of soils in Barmer district.

Sandy

Sandy, as it is very clear by its name, is found all over and this type of soil occupies about three-fourth of the total area of the district. Because of this the cropping intensity is very low.

Sandy Clay(Nayar)

It is heavily impregnated with salt, therefore produces less crops.

Deposited Loam(Rel)

It is found near the river beds; and

Accumulated deposit (Par)

It is also found near the river beds at the foot of lime stone ridges.

The last two types of soils are excellent for agriculture and vegetation and often yield two crops even without proper irrigation. Siwana tehsil has this type of soil. Unfortunately the total area under such soil is not sufficient. In the district as a whole, however, the quality of soil is not fit enough for the development of agriculture.

Due to inadequate rainfall and very high temperatures soil erosion is a common feature of the district and causes serious problems. The district is mostly affected by sheet erosion as the loose sandy soil is blown by strong winds. However, in the relatively damper eastern tehsils of the district gully erosion is also caused.

The traditional ways of checking erosion is to plant trees along the boundaries of fields. They offer some resistance to the strong winds. The district authorities are in fact experimenting with some types of shrubs which could offer greater resistance and consequently check erosion to a greater extent. Under the soil conservation programmes implemented between 1975 and 1978 approximately 18000 hectares have been brought under conservation.

Land Use Pattern

Looking at the land use pattern of the district it is observed that the district has a rather low net area sown. In the year 1970-71 net area sown was only 44.85 per cent of the total area. This percentage, however, went up by 1978-79 to around 53.48 per cent and again came down slightly to 50.71 per cent in 1979-80 which incidentally was a year of drought. It is on account of the depressing effect of the Thar desert that the net sown area is low. A significant proportion of the total area is under other fallows which accounted for nearly 21 per cent of the area in 1970-71. Adding to this around 5 per cent of area under current fallows we get a total area of nearly 26 per cent under fallow land and this again shows the extent to which nature restricts the proper extension of agriculture in the district. It is, however, encouraging to note that the Chunk under other fallows has come down by nearly half in 1979-80 (11.23 per cent) as compared to 1970-71. But in 1979-80 area under current fallows registered an increase and around 9.5 per cent land came under it. This percentage was slightly lower (around 8 per cent) in 1978-79. Barren and uncultivable land account for around 5 per cent of the total area. However, it is significant to note that over the years greater area is ^{being} brought under double cropping. In 1970-71 only 0.5 per cent of the net area sown was sown more than once. This percentage went up to 1.75 in 1978-79 and to 1.93 per cent in 1979-80.

The land use pattern of the district shows a very meagre area under forests. The area under forests was 0.44 per cent in 1970-71 and went up to 0.54 per cent in 1979-80. In fact Shiv and Siwana tehsils are the only areas having some forests. Of them Siwana is better off and has a reserved forest. In Shiv efforts are being made to grow trees in an area of around 60 k.m. If the effort is successful these rows of trees should act as a barrier to the desert from spreading any further. At present the desert is expanding eastwards at an annual rate of approximately 0.8 k.m.

Table 1.1

Land Use Pattern - Barmer

	<u>1970-71</u>	<u>1978-79</u>	<u>1979-80</u>
Geographical Area	2817159	2817316	2817316
Cultivable Area	2391668	2389771	2388506
Forests	12314 (0.44)	14681 (0.52)	15133 (0.54)
Barren & Uncultivable	157740 (5.60)	142247 (5.05)	140264 (4.98)
Land put Non-agricultural Use	50053	58162	59643
Cultivable Waste	421436	374620	375054
Permanent Pastures & Grazing Land	205348	212475	213770
Miscellaneous tree crops etc.	1	-	-
Current Fallows	117491 (4.97)	221154 (7.85)	268387 (9.53)
Other Fallows	589355 (20.92)	287182 (10.19)	316386 (11.23)
Net Area Sown	1263385 (44.85)	1506815 (53.48)	1428679 (50.71)
Area Sown More Than Once	6477	26310	27586
Gross Cultivated Area	1269862	1533125	1456265

Water Resources

Barmer district is located in the predominantly arid zone of western Rajasthan. As a result, there are very few rivers in

the district. The important river is the Luni and its tributaries.

Luni river with its two tributaries Sukri(A) and (B) has a total length of about 514 kms., of which about 193 kms. lies in the district.

Table 1.2

Name of River	Length of the river in the district in Kms.	Catchment Area in Sq.kms.
Luni	193.00	4050.00
Tributaries :		
Sukri 'A'	24.00	130.00
Sukri 'B'	32.00	148.00
Total		4328.00

The river rises in the hills south west of Ajmer and after passing Govindgarh, is joined by the Saraswati stream of Pushkar lake. Through Nagaur, Pali and Jodhpur it enters in Barmer near Rampura in Pachpedra tehsils and goes to Jalor district. There is no natural lake in Barmer district. There is a depression of 202 ha. near Thab in Pachpadra tehsil which is filled by rainy water.

Apart from surface water, the ground water resources are very limited due to various reasons like erratic and scanty rainfall, availability of water at deeper level, sandy factors etc. Thus all the available ground water can not possibly be lifted for use. The assessment of ground water is given below;

Recharge	385.037 MCM
Draft	67.995 MCM
Surplus	317.075 MCM
Exploitable potential	268.69 MCM

The fluctuation in the respect of water level is also found in the district during pre and post monsoon periods. The annual fluctuation is more in case of Barmer and Pachpadra tehsils as the normal rainfall in these tehsils is also more than the other three tehsils. Generally the wells in the district retain water in summer months also provided they are deep enough. Even in drought period, the wells usually do not dry up, but the water level goes down to a maximum extent. The surplus can be better exploited than at present by providing deep wells and this could ease the problems of the area to a certain extent.

Minerals

Barmer district is actually poor in metallic minerals but there are potentialities of exploring non metallic minerals deposits such as Gypsum, Salenite, Fullers earth, Bentonite, Clay, Glass Sand, Salt etc.

Bentonite is used in foundary moulding, insulation against water seepage increasing the plasticity of ceramic clays etc. The deposits are found in Gival, Akli, Thumbli, Gunga, Harwecha and Shiv villages in Shiv tehsil and at Bisala and Sauri villages in Barmer tehsil. Its availability from the various deposits in the district is estimated about 11 Tonns a year. There is one

factory in Barmer for grinding the mineral into powder form. Bentonite is exported mainly to Bombay and Calcutta and to Pakistan and Burma.

The district is very rich and famous for salt deposits. Salt is cultured in Pachpadra lake, which is about 24 kms. north east of Balotra town. The salt industry supports the population of about 25 surrounding villages by providing them work. This industry was leased by the king of Jodhpur to the government of India and was transferred to the Government of Rajasthan in 1960. From the very beginning, it has been used as a source of salt, and systematic exploitation began nearly 450 years ago.

Besides these, large deposits of Fuller's Earth are found in the north of Barmer in Kampudi and Rohili villages.

Gypsum deposits are located near Kavas and Utarlai and the total reserves of the area are estimated to be 2.06 and 7.5 million tonnes respectively. Since this is an important fertilizer mineral the Sindri fertilizer factory purchases it directly for its use.

Selenite and Lignite are also found in the district. The former, which is used in the manufacture of plaster of paris has an annual yield of 400 tonnes and its deposits are found in Thob village of Pachpadra Tehsil. In the case of lignite the department of mines and geology have taken charge of its excavation around Shiv tehsil. Some deposits of glass sand and clay are also found in Barmer tehsil. The district received a net revenue of around Rs.68.45 lakhs from these minerals in 1980.

Table 1.3

Revenue of Barmer District from Minerals in 000' Rs.

Name of the Minerals	Year							
	1973	1974	1975	1976	1977	1978	1979	1980
Non-Metallic Minerals:								
i. Gypsum	204	623	49	45	359	NA	NA	902.69
ii. Selenite	33	10	62.5	1	157	NA	NA	NA
Minor Minerals:								
Bajri Kankar	34	21.5	218	26	338	NA	NA	132.0
Machinery Stone	66	208.0	502	337	3606	NA	NA	3579.6
Bentonite	169	372.0	NA	356	976	NA	NA	1467.2
Fullers Earth	375	460.0	307	348	213	NA	NA	763.8
TOTAL	881	1696.5	1138.5	1113	5649	NA	NA	6845.29

Livestock

Livestock is a part and parcel of the rural economy in Rajasthan and as such Barmer is no exception particularly because the conditions as obtained in the district are not conducive to agriculture. Accordingly, a large section of the rural population depend upon cattle and sheep for their subsistence which are kept in large numbers. The shortage of grazing land is, however, a problem as pastures and grazing land account for only 7.59 per cent of the total area. The desert-type conditions do not permit the pastures to develop properly and the animals are grazed along the hills. During the years of drought and scarcity there is a mass migration of animals to neighbouring areas and even to Gujarat.

The total livestock population of the district was 19.74 lakhs in 1972 and their numbers rose to 25.32 lakhs by 1977. Livestock population, therefore, registered an increase of 28.26 per cent between 1972 and 1977. Goats and sheep are the species of animals which offer a greater resistance to the adversities of nature and so they can be brought up with relative ease. They, therefore, constitute a big chunk of the livestock population. In 1977 for instance, the population of sheep was 33.45 per cent of the total while goates constituted 43.81 per cent and they together, therefore, formed over three fourths of the total livestock population. The other livestock population comprised of cattle, buffaloes and camals.

Poultry farming is almost negligible and has not been taken up seriously even as a secondary source of income.

Table 1.4
Livestock - Poultry

S.No.	Name	Two Points of Time	
		1972	1977
1.	Cattle	179625	387652
2.	Buffaloes	13567	29064
3.	Sheep	567656	847011
4.	Goats	1088932	1109506
5.	Horses and Ponies	1398	2461
6.	Bulls and Donkeys	24913	41049
7.	Camels	98243	115543
8.	Pig	15	27
	Total	1974350	2532313
	% of Growth	-	28.26%
9.	Poultry	5836	5948
	% of Growth	-	1.91%

The physical and natural characteristics of the district present a natural pattern of dependency relations between people and livestock.

CHAPTER II

Human Resources

Barmer has a total population of 11.14 lakhs as recorded by the 1981 Census. This works out to be around 3.26 per cent of the state population. In 1971 the population was 7.75 lakhs so the decennial growth recorded was 43.76 per cent which is higher than the growth rates recorded by the state (32.38 per cent) or India (24.75 per cent) during the same period. The decadal variations in the population of the district are given in the table below :

Table 2.1

Trends in Population Growth of Barmer

S.No.	Years	Population	Variation in Population	Decennial Growth (Percentage)
1.	1901	315000	-	-
2.	1911	301000	-14000	-4.34
3.	1921	283000	-18000	-6.04
4.	1931	308264	25264	9.53
5.	1941	394529	86265	27.98
6.	1951	477282	82753	20.48
7.	1961	649794	172512	35.20
8.	1971	774805	125011	19.24
9.	1981(P)	1113823	339018	43.76

Source : Census of Rajasthan.

The population growth shows an overall increasing trend although there are fluctuations in the rates from one decade to another and that the growth rates for the two decades 1901-11 and 1911-21 were negative. Between 1901-11 the decline in the population was the consequence of a severe malarial fever spread during 1908 and took a heavy toll of

that spread during 1908 and took a heavy toll of human lives. In the succeeding decade, however, the entire state was faced with adverse factors which were detrimental to growth. The positive trend begins after 1921 although it was low (9.53 per cent) to begin with. Thereafter population growth has been continuously positive with 1971-81 registering the maximum growth.

Table 2.2

Sex-wise Distribution of Urban and Rural Population in Barmer

Area	1971			1981			Percentage to total population 1971	Percentage to total population 1981
	Male	Female	Total	Male	Female	Total		
Rural	379703	338877	718580	531501	486195	1017696	92.74	91.37
Urban	30945	25280	56225	51918	44209	96127	7.26	8.63
Total	410648	364157	774805	583419	530404	1113823	100.00	100.00

Looking at the trends in the rural-urban composition of population we find only a marginal change between 1971 and 1981. The rural population of 1971 constituted 92.74 per cent of the total population. By 1981 this percentage had gone down to 91.37 per cent. During the decade rural population showed an increase of 41.63 per cent whereas its urban counterpart went up by 70.97 per cent. What is interesting is that between 1971 and 1981 the percentage of males to total rural population has shown approximately the same proportion whereas in the case of the

urban population this percentage has gone down by one per cent.

Density of Population

According to the 1981 Census the density of population in the district was only 39 as against 100 of the state and 208 of the country as a whole. Being a desert area the population is scattered over the entire stretch of the district and this is primarily the reasons for the rather low density. Among the tehsils the density becomes even lower if we go west towards the desert area and this is brought out by the fact that Shiv tehsil has a density as low as 15. Siwana on the other hand has a relatively higher density and is ranked first among the tehsils with a density of 49.

Table 2.3

Male Female Population and Sex-Ratio in Barmer

Particular	1971			1981			Growth Rate %	
	Male	Female	Sex- Ratio	Male	Female	Sex- Ratio	Male	Female
Barmer	410648	364157	387	583419	530404	909	42.02	45.65
Rajas- than	13484000	1228200	911	17735780	1637504	923	31.53	33.32

Sex-Ratio

In Barmer the population of females has increased at a higher rate than that of males. The decadal growth rate (1971-81) of males was 42.02 per cent whereas that of females was 45.65. The corresponding figures for the state as a whole being 31.53 and 33.32. As a consequence of the higher growth rate of females

the sex-ratio has increased from 887 in 1971 to 909 in 1981. However the sex-ratio is slightly lower than that obtained in the state at both points of time. The sex-ratio is 915 and 852 for the rural and urban areas respectively.

Socio-Demographic Features

Literacy plays an important role in the lives of people. Changes in the modes of production, whether it be with respect to adoption of new techniques in agriculture or industry, can be brought about much quicker if those who are to adopt them are literate. An illiterate person on the other hand will be more inclined to stick to the old technique and as such it may be much more difficult to introduce the change. The same holds for adopting changes in the life style in general and economic development becomes easier in areas where level of literacy is higher.

Table 2.4

Literacy Percentage in Barmer

Areas	1971			1981		
	Male	Female	Total	Male	Female	Total
Rural	13.19	2.91	8.38	15.83	1.78	9.11
Urban	54.30	19.64	38.72	56.93	24.85	42.17
Total	16.95	3.40	10.58	19.49	3.70	11.97

Barmer, unfortunately ranks last in 1981 among the 26 districts of Rajasthan as far as literacy is concerned. The level is particularly low in the rural areas which accounts for over

90 per cent of the population. The overall literacy in the district was 10.53 per cent only in 1971. What is rather distressing is that within a span of ten years literacy percentage has gone up to only 11.97 (Table 3.2). The corresponding literacy rate for the state stood at 24.05 per cent and that of the country 36.17 per cent in 1981. Thus literacy percentage is less than half that of the state and not even one third of the country.

Looking at the breakup of literacy rates in the rural and urban areas we find that not much has been achieved in the rural areas where literacy rates particularly among females are extremely low. The overall literacy levels in the rural areas was 8.38 per cent in 1971. Its breakup among males and females was 13.19 and 2.91 per cent respectively. By 1981 overall literacy stood at 9.11 per cent. The male literacy had gone up to 15.83 per cent but in the case of females literacy rates showed a decrease since only 1.78 per cent females were literate in 1981. In the urban areas, however, literacy rates are much higher. Urban literacy rate was 38.72 per cent in 1971 and went up to 42.17 per cent in 1981. Male literacy level was above 50 per cent in both the Census years and in the case of females there was a reasonable increase from around 19.5 per cent to nearly 25 per cent. But since over 90 per cent of the population is residing in rural areas literacy rates are pulled down considerably to make Barmer the least literate district of Rajasthan.

Table 2.5Scheduled Caste/Tribe Population in
Barmer District

Caste	1971		1981		Variation (+) (-)
	Popula- tion	% to total Popula- tion	Popula- tion	% to total Population	
Scheduled Caste	111429	14.38	174908	15.70	56.96
Scheduled Tribe	44500	5.74	57038	5.12	28.15
Total SC + ST	155937	20.12	231946	20.82	48.74
Total District Popula- tion	774805	-	1113823	-	43.76

Source : Census of Rajasthan.

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Scheduled Caste and Scheduled Tribes

There has been only a marginal change in the proportion of scheduled castes and scheduled tribes to the total district population between 1971 and 1981. Scheduled Caste population was 1.11 lakhs in 1971 and constituted 14.38 per cent of the total population. Their numbers had gone up to 1.75 lakhs in 1981 and the corresponding percentage increased to 15.70 per cent. In the case of scheduled tribes on the other hand their number was 44.5 thousand in 1971 and went up to 57 thousand by 1981. The corresponding percentages were 5.74 and 5.12 respectively for the two Census years. The decadal variation in the SC/ST population (48.74) is slightly higher than that of the overall

growth of population (43.76 per cent) and is much higher in the case of the scheduled castes which have registered a decennial growth rate of nearly 57 per cent.

Work-Force Participation Rates

Two factors which directly affect the work-force participation rates in a district are the overall level of economic development and the availability of job opportunities. In fact the latter is itself a function of the former (economic development). In Barmer the total work-force of 2.64 lakhs in 1971 was 34.05 per cent of the district population. By 1981, the total number of workers had gone upto 3.07 lakhs. However, workforce participation rates had gone down to 31.68 per cent according to the Census of 1981. The percentage of main workers to total population in the different tehsils of the district ranges between 30 to 34 percent and thus does not show a great variation as compared to the percentage obtained at the district level.

Table 2.6

Percentages of Work-force of Barmer District

Years	Population			Worker			Workforce			
	Male	Fe- Male	Total	Male	Fe- Male	Total	Male wor- ker as a % of total population	Female worker as a % of total female population	Total wr- kers as a % of total population	
1971	410648	364157	774805	230360	33506	263866	56.10	9.20	34.05	
1981	583419	530404	1113823	307370	45521	352891	52.68	8.58	31.68	

Looking at the variation in the growth rates of the main workers in the district we find that whereas the population has recorded a growth rate of 43.76 per cent the growth rate of the main workers is only 33.74 per cent. The male and female growth rates have been around the overall growth rate of the total workers with females showing a slightly higher growth rate (35.86 per cent) as compared to the males (33.43 per cent). However, at the tehsil level we find wide variations in the growth of male and female workers. In 3 out of the 5 tehsils the growth rates of female workers have been extremely high with Shiv tehsil registering around a six fold increase. The growth rate is below the district average in the case of Chohatan whereas in the case of Barmer tehsil we find a decline even in the absolute numbers of female main workers whose numbers declined from 19402 in 1971 to 19089 in 1981. Growth of male workers too is found highest in Shiv tehsil (62.98 per cent) while Barmer tehsil is at the bottom (26.38 per cent).

Taking total main workers tehsil-wise the main chunk of workers are obviously males whose percentage has been around 87 per cent in both the Census years. Even if we look at male and female workers as a percentage of the corresponding male and female population, it is observed that male workers constitute around 52.5 per cent of the male population while female workers account for barely 8.5 per cent of the total female population. The workforce participation rate when viewed on a rural urban basis brings out the typical rural character of the economy since

nearly 93 per cent of the total workers are from the rural areas in 1981. The picture is the same when we see the tehsil-wise figures of workers with the exception of Pachpadra tehsil which has a slightly higher percentage of urban workers (13.79 per cent).

Classification of Workers by Occupational Structure

The provisional figures given in the Census of 1981 do not give the full details of the workers by occupational structure. Cultivators, agricultural labourers and workers engaged in household industries alone have been identified. The remaining categories of workers have all been clubbed together as 'other workers'. For the sake of comparison, therefore, we shall use the same four categories for 1971 as well.

The district had in 1971 slightly over two lakh main workers of which 80.72 per cent were cultivators. By 1981 this percentage had registered a marginal decrease (79.16 per cent). In the case of agricultural labourers, however, there has been a decrease not only in the percentage but also in their absolute number which came down from 17,805 in 1971 to 10,050 in 1981. In terms of percentages agricultural labourers constituted 6.75 per cent of the main workers in 1971 but only 2.85 per cent in 1981. The drop in percentage was particularly sharp in the case of females. Cultivators and agricultural labourers taken together constitute over 80 per cent of the total main workers and shows how heavily the population is dependent upon agriculture.

Table 2.7

Distribution of Workers by Occupational Classification
1971 and 1981

District : BARMER

Tehsil/District	Total main worker															
	Cultivator				Agri. Labourer				Household industry				Other workers			
	Male	Fe-	Total	Male	Fe-	Total	Male	Fe-	Total	Male	Fe-	Total	Male	Fe-	Total	Male
1. Sheo	1971	18231	679	18910	16017	493	16510	775	118	893	135	42	177	1304	26	1330
	1981	29712	4741	34453	26957	4463	31420	297	12	309	288	140	428	2170	126	2296
% share of different categories																
within	1971															
Tehsil	1981															
2. Barmer	1971	107545	19402	126947	87.86	72.61	87.31	4.25	17.38	4.72	0.74	6.19	0.94	7.15	3.83	7.03
	1981	135921	19089	155010	90.73	94.14	91.20	1.00	0.25	0.90	0.97	2.95	1.24	7.30	2.66	6.66
% share of different categories																
within	1971															
Tehsil	1981															
3. Pachpadra	1971	34564	3125	37689	82.18	89.08	83.24	3.64	4.60	3.79	1.70	1.90	1.73	12.47	4.42	11.24
	1981	48811	7490	56331	77.35	78.12	77.45	1.86	3.01	2.00	2.65	2.91	2.68	18.14	15.96	17.87
% share of different categories																
within	1971															
Tehsil	1981															
4. Chochtan	1971	43060	7394	50454	70.71	46.88	68.92	9.65	42.05	12.34	3.64	3.68	3.65	15.80	7.39	15.10
	1981	57818	8662	66480	66.17	75.05	67.35	2.72	6.14	3.18	1.57	3.97	4.49	26.54	14.85	24.99
% share of different categories																
within	1971															
Tehsil	1981															
5. Siwana	1971	26960	2906	29866	89.25	84.54	88.56	5.41	12.44	6.44	0.77	1.93	0.74	4.57	1.08	4.06
	1981	35078	5539	40617	91.66	92.55	91.77	2.33	2.44	2.35	1.31	3.38	1.58	4.70	1.63	4.30
% share of different categories																
within	1971															
Tehsil	1981															
% share of different categories	1971															
within	1981															
Tehsil	1981															

Table 2.7 (contd,...)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
6. District																
Barmer	1971	130360	33506	263866	186083	26910	212993	13310	4495	17805	4206	732	4938	26760	1369	28129
	1981	307370	45521	352891	242365	36983	279348	7869	2181	10050	8200	1570	9770	48936	4787	53723
% share of different categories																
within	1971				80.78	80.31	80.72	5.78	13.42	6.75	1.83	2.18	1.87	11.62	4.09	10.66
tehsil	1981				78.85	81.24	79.16	2.56	4.79	2.85	2.67	3.45	2.77	15.92	10.52	15.72

Note : Percentage mentioned correspond to total main workers and are calculated separately for total, male and female workers.

Table 2.8

Distribution of Workers by Occupational Distribution on a Rural/Urban Basis for 1981

Tehsil/ District	Total Main Worker				Cultivator				Agri. Labour				Household Industry				Other Worker			
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male
1. Sheo	34453	29712	4741	31420	26957	4463	309	297	12	428	288	140	2296	2170	126					
Rural	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Urban	34453	29712	1741	31420	26957	4463	309	297	12	428	288	140	2296	2170	126					
Urban	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Barmer	155010	135921	19089	120052	105139	14913	3101	2526	575	4161	3606	555	27696	24650	3046					
Rural	(91.18)	(90.46)	(96.30)	(99.50)	(99.45)	(99.83)	(96.88)													
Urban	141338	122955	18383	119453	104564	14889	3004	2436	568	2950	2546	404	15931	13409	2522					
Urban	(8.92)	(9.54)	(3.70)	(0.50)	(0.55)	(0.17)	(3.12)													
Urban	13672	12966	706	599	575	24	97	3.57	(1.21)	121	1060	151	11765	11241	524					
Urban	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Panchpada	56331	48841	7490	37937	32316	5621	1790	1330	460	2529	2232	297	14075	12963	1112					
Rural	(86.21)	(84.62)	(96.57)	(97.98)	(97.72)	(99.46)	(85.92)													
Urban	48561	41328	7233	37172	31581	5591	1538	1090	448	1851	1605	246	8000	7052	948					
Urban	(13.79)	(15.38)	(3.43)	(2.02)	(2.28)	(0.54)	(14.08)													
4. Chotnan	7770	7513	257	765	735	30	252	240	12	678	627	51	6075	5911	164					
Rural	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Urban	66480	57818	8662	61012	52995	8017	1560	1349	211	1049	756	293	2859	2718	141					
Urban	66480	57818	8662	61012	52995	8017	1560	1349	211	1049	756	293	2859	2718	141					
Urban	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Contd.....

Table 2.8 (contd..)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
5. Siwana	Total	40617	35078	5539	28927	24958	3969	3290	2367	923	1603	1318	285	6797	6435	362
		(91.65)	(90.67)	(97.85)	(95.23)	(94.57)	(99.42)	(87.78)	(83.56)	(98.59)	(83.28)	(85.28)	(81.05)	(79.98)	(79.30)	(91.99)
	Rural	37227	31807	5420	27548	23602	3946	2888	1978	910	1355	1124	231	5436	5103	333
		(8.35)	(9.33)	(2.15)	(4.77)	(3.43)	(0.58)	(12.22)	(16.44)	(1.41)	(16.72)	(14.72)	(18.95)	(20.02)	(20.70)	(8.01)
	Urban	3390	3271	119	1379	1356	23	402	389	13	248	194	54	1361	1332	29
6. District Barmer	Total	352891	307370	45521	279348	242365	36983	10050	7869	2181	9770	8200	1570	53723	48936	4787
		(92.96)	(92.27)	(97.62)	(99.01)	(98.90)	(99.79)	(92.53)	(90.86)	(98.53)	(78.13)	(77.06)	(83.69)	(61.26)	(62.23)	(85.02)
	Rural	328059	283620	42439	276605	23699	36906	9299	7150	2149	7633	6319	1314	34522	30452	4070
		(7.04)	(7.73)	(2.38)	(0.99)	(1.10)	(0.21)	(7.47)	(9.14)	(1.47)	(21.87)	(22.94)	(16.31)	(35.74)	(37.77)	(14.98)
	Urban	24832	23750	1082	2743	2666	77	751	719	32	2137	1881	256	19201	18484	717

Note : Figures in brackets are rural/urban percentages to total workers.

Source: Rajasthan Census, 1981.

While in the case of household industry there is only a marginal increase in workers the percentage of workers catagorised as 'other workers' has gone up by 5 per cent. The drop in percentage of female agricultural labourers seems to have been made good by the female 'other workers' whose percentage has gone up from 4 per cent in 1971 to 10.5 per cent in 1981. Thus, although there is a heavy dependence on agriculture an increase in the percentage of non-agricultural workers from 12.5 to 18.5 per cent suggests that pressure on agriculture has been somewhat relieved.

Among the tehsils Pachpadra has the highest percentage of non-agricultural workers (29.48 per cent) and is followed by Barmer and Siwan each having around 20.5 per cent. These three tehsils have a higher percentage of non-agricultural workers than the district average (18.5 per cent). The percentages are, however, very low in the case of Chohatan (5.88 per cent) and Sheo (7.90 per cent) tehsils. Of the total urban workers in Barmer tehsil almost 95 per cent are in the non-agricultural sector. This percentage is very high in the case of Pachpadra tehsil as well (around 87 per cent). In Siwana the percentage is below 50 while Chohatan and Sheo have no urban workers at all.

Urbanisation

The district has only three towns viz. Barmer, Balotra and Siwana. Of these Siwana has been classified as a town for the first time in 1981. The towns have a low population with Barmer being the most populated (53,427). Balotra (28,091 persons) is second while Siwana has a population of only 14601. The district therefore has a very low level of urbanisation with an urban population of only around 8.5 per cent. Barmer town has registered a decadal growth rate of 38.30 per cent which is below the overall growth rate of the district (43.76 per cent). Balotra, on the other hand had a higher than average growth rate (59.70 per cent). The higher growth rate of Balotra could be on account of the numerous small scale and cottage industries (460 in all) located in it, the major bulk of them being the textile and leather units. In fact Balotra accounts for almost 65 per cent of the total small scale and cottage industries of the district. It may be that the rural population was attracted towards the urban area to seek job opportunities in these small scale and cottage industries and also to set-up their own units.

Barmer is among the most backward districts because over 90 per cent people dwell in remote, scattered, thinly populated and desert villages wherein agriculture remains the

main source of subsistence. The district has a high degree of illiteracy and is insignificantly urbanised which presents a poor state of development of industrial activities. Hence, Myint's concept of backwardness wholly stands true in the district.

Chapter-III

INCIDENCE OF DROUGHT

Drought has been defined by different disciplines in different terms in view of their respective purposes. All the same what is well known is that drought causes ecological distress whereby the masses in general are affected. The degree to which the population is affected depends upon the relative intensity of the drought.

Hydrological drought for instance occurs when there is a marked depletion of surface water and consequent drying up of reservoirs, lakes, streams and rivers etc. In such a situation the run-off is less than 75 per cent of the normal run-off. Yet another drought is the one defined by the economists who say that economic drought is a situation when production falls below expectations. Similarly meteorological drought is said to occur when there is a significant (more than 25 per cent) decrease from the normal precipitation over an area.

India being predominantly an agricultural country the type of drought that should interest us most is the agricultural drought and we shall mainly be concerned with it for the purpose of our study. This is so because almost 80 per cent of the total population depends upon their livelihood on agriculture. Agricultural drought occurs when the supply

of moisture from rainfall or from the soil is not sufficient to cater to the basic needs of the plants. Thus agricultural drought is contingent drought resulting from irregular and variable rainfall particularly during periods when the crops are in greater need of water and consequently as a lack of both rainfall and moisture the growth of plants is adversely affected. Climatic conditions are found different over different areas and as such drought has to be related to the basic climate.

For the identification of drought in India various criteria have been adopted by the Irrigation Commission (1972), the National Commission on Agriculture (1976) and the various State Governments.

The Irrigation Commission while defining drought in 1972 said that drought is a situation occurring in an area in a year when the rainfall is less than 75 per cent of the normal. It defined 'moderate drought' as obtaining where the rainfall deficit is between 25 to 50 per cent and 'severe drought' where the deficit exceeds 50 per cent. Areas where drought has occurred as defined above in 20 per cent of the years examined, are considered drought areas, and where it has occurred in over 40 per cent of the years, as chronic drought areas. The Commission has recommended the exclusion

of such areas where 30 per cent of the cultivated area is irrigated, from the list of drought districts on the ground that irrigation facilities have reached a stage where agriculture has been reasonably protected against drought.

Similarly, the National Commission on Agriculture has defined agricultural drought as an occasion when the rainfall in a week is half or less of the normal, when the normal weekly rainfall is 5 mm. or more. The drought is a period of four such consecutive weeks in the period middle of May to middle of October or six such consecutive weeks during the rest of the year.

The State Governments have, likewise, given their own definition for the identification of drought areas. The criterion adopted by the States varies somewhat depending upon the prevailing situations and conditions. The government of Rajasthan, for instance, has classified drought areas where the ratio of good crop year to scarcity year was 2:1 or less and where 15 per cent of the villages of the area were affected by drought. Let us now turn our attention to the extent of rainfall and the level of irrigation both of which are important in the classification of a district as drought prone.

Rainfall

The rainfall of India is orographic in nature and is associated with two distinct seasons, i.e. the South-West monsoon and the post monsoon. Barmer district receives 91.7 per cent of the normal annual rainfall from the South-West monsoon. It occurs in the last week of June and lasts upto the end of September. August is the month of heavy rain. The highest annual rainfall of 795.5 mm. was recorded in 1944 as against 266.69 mm. normal rainfall in the district. Post monsoon rainfall does not have any significance. Only 2 per cent of the annual rainfall occurs during October and November. 6.3 per cent of the annual rainfall is received during December and January. In Barmer district 10 rain gauge stations are functioning. These stations cover the total geographical area of Barmer. The density works out to one rain gauge station for an area of 2952.1 Sq. Kms.

During the whole year there are 20.2 rainy days with the Tehsil figures varying between 18.8 at Pochpadra to 22.7 in Siwana. The normal monthly intensity of rainfall varies from 7.00 in December to 23.1 in August. The rainfall characteristics between 1901 to 1980 are being presented in a tabular form (Table 3.1).

Table 3.1

Characteristics of Rainfall Between 1901-1980

Characteristics	Overall Cycle 1901-1980	1st Cycle 1901-1940	2nd Cycle 1941-1980
Normal rainfall (mm)	266.7	266.9	266.5
Percentage of rainfall from S.W. Monsoon	91.7	91.5	91.7
No. of years in which rainfall is below normal	49	23	26
No. of years when rainfall was below 75% of normal	29	12	17
S.D. of annual rainfall	164.8	145.5	148.6
C.V. of annual rainfall	61.2	54.5	55.8
Maximum annual rainfall (mm) and year of occurrence(1944)	795.5	707.5 (1917)	795.5 (1344)
Minimum annual rainfall (mm) and year of occurrence(1918)	24.6	24.6 (1918)	46.9 (1969)
Normal No. of rainy days	13.2	12.7	13.6
Normal intensity of rainfall (mm)	20.2	20.96	19.59
Frequency of failure of rainfall with respect to normal (%)	61.2	57.5	65.0
Frequency of failure of rainfall with respect to 75 per cent of normal (%)	36.2	30.0	42.5

For the purpose of studying the characteristics of rainfall the study has been done for the period 1901 to 1980. Within this also the data has been split into two parts of 40 years each. It can be seen from the Table 3.1 that there is no difference in the normal rainfall between the two cycles. Similarly between the two cycles there is no divergence in the percentage of rainfall received during the monsoons either. However, if we look at the number of years in which the actual rainfall was either less than normal or was below 75 per cent of the normal it is seen that the second cycle (1941-1980) has a greater number of years when the shortfalls from normal have been greater as is also reflected in the frequency of failure of rainfall with respect to both normal and 75 per cent of normal. Consequently the values of standard deviation as well as co-efficients of variation of annual rainfall are higher in the second cycle as compared to the first.

Let us now look at the rainfall received during the months of June and July when their need is greatest for sowing Kharif crops, since adequacy of rainfall at the appropriate time is equally, if not more important, than its total availability. Timely rainfall would mean a proper crop which will lead to increased production and an overall betterment of the masses dependent upon agriculture. For this purpose we have made a table showing the actual rainfall for the months of June and July from 1970 to 1980 and also of the actual annual rainfall.

Table 3.2

Actual Rainfall for June and July in Barmer
1970 to 1980

Year	June	July	Actual annual
1970	19.48	55.32	252.12
1971	55.86	99.66	197.87
1972	28.58	52.45	167.80
1973	25.68	48.80	487.34
1974	6.02	6.80	83.30
1975	44.96	168.82	540.22
1976	9.68	132.22	463.02
1977	65.76	103.54	243.20
1978	44.02	110.90	270.52
1979	20.62	72.14	294.40
1980	45.42	96.82	172.90
Normal Rainfall	23.71	85.98	266.69

It can be seen from the above table that in the eleven year period there have been four years when the actual rainfall in June was below the average monthly rainfall. Similarly in the case of five years the actual rainfall of July was below the average monthly rainfall. 1979 is the year when although the actual rainfall was above the district average yet in both June and July the rainfall received was below the

normal for the two months. On the contrary we have two years, 1971 and 1972, when rainfall in both or at least one month was above the monthly average even though the actual rainfall received was considerably below the normal annual rainfall.

Irrigation

The district has a very poor irrigation network. In fact only 1.23 per cent of the net area sown is irrigated. Likewise the gross irrigated area as a percentage of the gross cropped area is only 1.68. Rajasthan as a whole has around 17.6 per cent of its gross cropped area under irrigation and so it is evident that irrigation facilities are badly lacking in the district and Barmer is among the least irrigated districts of the State.

There are no major or medium irrigation projects in the district. However, the district has a few minor irrigation schemes most of which have been started under Drought Prone Area Programme and famine relief works and they total 63 in number under which the entire district is covered. But the area irrigated is negligible (1330 ha.). There are other eight projects which are under construction and they are expected to cover another 627 hectares.

The major source of irrigation in the district are wells and tubewells and they together account for as much as 99.25 per cent of the total irrigated area.

The district had in all 9418 wells and tubewells in 1979-80. Of these only 7025 were in use. The others, numbering over two thousand have dried-up. Shiv tehsil is the worst off where around 40 per cent of the wells have dried up as compared to the district average of around 25 per cent. Siwana has the maximum number of wells and is closely followed by Barmer and these tehsils together account for slightly over 70 per cent of the total number of wells in the entire district. While Shiv tehsil has the highest drying rate it also has the least number of wells (around 4 per cent only) and as such the area is invariably facing acute shortage of water particularly during the summer months. The other sources like canals, tanks, etc are only negligible. Table relating to wells and source-wise irrigation is being given in Table 3.3. and 3.4 below.

Table 3.3

Source-wise Irrigated Area in Barmer
(Area in Hectares)

Tehsils		Wells and Tubewells		Tanks		Total	
		Net	Gross	Net	Gross	Net	Gross
Barmer	1971	1040	1583	-	-	1040	1583
	1979	3051	7171	-	-	3051	7171
Shiv	1971	3	3	-	-	3	3
	1979	4	7	-	-	4	7
Chohatan	1971	8	14	-	-	8	14
	1979	337	1478	-	-	337	1478
Siwana	1971	4975	5832	65	65	5040	5897
	1979	14172	19716	-	-	14172	19716
Pachpadra	1971	4149	5823	-	-	4149	5823
	1979	6219	8348	-	-	6219	8348
District as a whole	1971	10175	13210	65	65	10240	13275
	79	23783	36720	-	-	23783	36720

Source : Collectorate Barmer.

Table 3.4

Tehsil-wise Distribution of Wells in Barmer

Tehsils	Total wells	Wells in use	% of dried up wells
Barmer	3096	2022	34.69
Shiv	510	303	40.59
Chohatan	1426	1235	13.40
Siwana	2914	2262	22.38
Pachpadra	1472	1203	18.28
DISTRICT TOTAL	9418	7025	25.27

In 1971 the net irrigated area in the district as a whole was 10240 hectares whereas the gross irrigated area was 13275 hectares. These figures had gone upto 23783 and 36720 hectares for net and gross irrigated areas respectively by 1979. This meant that the net irrigated area had registered an increase of around 132 per cent while gross irrigated area went up by about 176 per cent. These percentages speak well of the efforts made by the district authorities as far as extension of irrigation facilities is concerned. However, if we look at net irrigated area as a percentage of net area sown then between 1971 and 1979 this percentage showed only a marginal increase from 0.81 to 1.66. Likewise, the gross irrigated area as a percentage of gross cultivated area had

also a slight, although better, improvement as compared to the net irrigated area since the increase was from 1.04 per cent to 2.52 per cent.

Looking at irrigation at the tehsil level, Siwana and Pachpadra tehsils are both relatively better placed as compared to the remaining three tehsils of the district and they together accounted for nearly 90 per cent of the net area sown and nearly 86 per cent of the gross irrigated area in 1971. However, there was a slight decrease in the percentage of net irrigated area in 1979 and a considerable decrease in the percentage of gross irrigated area (76 per cent) under these two tehsils. This has been as a result of a fair progress made in Barmer tehsil which accounted for around 10 and 13 per cent of the total net irrigated area in 1971 and 1979 and around 11.5 and 19.5 per cent of the districts gross irrigated areas at the two points of time. Both the tehsils of Shiv and Chohatan form parts of the Thar desert and as such the scope for extension of irrigation facilities is limited and is amply reflected in the almost negligible net and gross irrigated areas of the two tehsils.

All the five tehsils without exception were utilising their net irrigated area for the cultivation of food grains in the year 1971. As much as 96.48 per cent of the irrigated area

was under food grains. By 1979 only Siwana has emerged as the single tehsil which has set aside a sizeable portion of its irrigated area for the cultivation of commercial crops. The area under commercial crops in Siwana is 28.75 per cent of the total irrigated area of the tehsil and this is primarily used for the cultivation of mustard. As a consequence of this change, the percentage of the irrigated area under food grains came down to 80.32 per cent in 1979. Pachpadra is another tehsil which has shown a slight increase in the irrigated area under commercial crops but this increase is from 2.73 per cent in 1971 to 8.04 per cent in 1979.

Looking at irrigated area under individual crops for the year 1978-79, Wheat and Barley among the food crops figure prominently with over 90 per cent of the total area under each crop being irrigated. In the case of non-food crops chillies and spices are cultivated entirely with the help of irrigation. Oil seeds are another category of cash crops where irrigated area is around 20 per cent of the total oil seeds cropped area. However, it must be kept in mind that all the crops being mentioned are those which have only a very small area under them to the total cropped area. Wheat, for instance, accounts for just about one per cent of the gross cropped area while in the case of oil seeds this percentage is around 0.67. The remaining crops have a negligible area under them.

On the whole, therefore, it is observed that the district is deficient not only in terms of rainfall but also very poor in terms of irrigation facilities as well.

Ground and Surface Water and Its Availability

Let us now look at the ground and surface water with respect to its availability as well as potential since this could be utilised more effectively to cater to the needs of the people.

The discharge of ground water takes place through withdrawals by dug-wells, hand pumps and tubewells, effluent seepage and evapotranspiration from shallow ground water area. In the irrigated area, a part of the water applied for irrigation goes back to the water table. In Barmer district where irrigated area is less, the temperatures are high and soils are sandy, the replenishment of ground water from water used for irrigation is not considered. Due to such limitations as erratic nature of rainfall, availability of water at deeper level, sandy factors, all the water available is not possible to be lifted for use. Thus, the exploitable potential is taken as 60 per cent to 100 per cent of the surplus depending upon the hydrological formation, recharge and draft.

The State Ground Water Department, Rajasthan undertook a survey for the assessment of ground water potential of Barmer during the period 1971-72 to 1975-76. Similarly, the Central Ground Water Board have also assessed the ground water potential in the district and published the data in 'Hydro-Geological Set-up and Ground Water Resources Potential of India', Central Ground Water Board, New Delhi. The details of the ground water potential assessed by both these organisations is being given in the table below:

Table 3.5

Sl. No.	Report	Recharge in MCM	Draft MCM	Surplus MCM	Exploitable potential MCM	Remarks
1.	State Ground Water Dept. Publication(1)	385.037	67.995	317.075	268.69	-
2.	Central Ground Water Board Publication(2)	87.78	12.88	74.90	-	Exploitable potential not mentioned

The figures given in Table above show ground water sources by the Central and State Ground Water Boards. The figures arrived at by the Central Ground Water Board do not appear to be realistic and as such have not been considered. On the basis of the calculations done by the State Ground

Water Department we can, however, say that there is a considerable potential which has not so far been tapped. Greater efforts are needed so that the ground water reserves are exploited to a maximum. The depth of water in this district varies from 1.55 to 117.3 meters in different areas. In general it is observed that the depth of wells is not enough to meet the required discharge. This is probably the reason why such a large number of wells (over two thousand) have gone dry. It is, therefore, suggested that the depth of wells should be increased substantially and wherever possible deep tubewells should be constructed such that maximum ground water potential is made available.

Barmer district as a whole is endowed with relatively lesser surface water resources. In terms of normal surface water resources all the tehsils are deficient, except in case of only Siwana tehsil which is slightly better off as compared to the rest. The scope to utilise surface water is limited because of wide fluctuations in the rainfall, the very high temperatures, sandy soil and lack of perennial rivers.

The surface water resources of Barmer calculated on the basis of the water balance method for the period 1901 to 1980 show a zero availability at 50 per cent and 75 per cent dependabilities.

The average surface flows from the district are estimated at 438.8 MCM. Of this also all can not be utilised on account of various limitations like lack of suitable storage or diversion sites; lack of adequate levels and the environmental conditions. With the rains being erratic and temperatures remaining high the rate of evaporation is also high. Thus rain water is lost either to evaporation or absorption in the soil. This is evident as no rivers or streams of importance exist in major portions of all the tehsils except the areas around river Luni. Thus, only in a very few pockets where the soils are moisture retentive, some water collects as a result of surface run-off. All the same maximum available surface water is 219.4 MCM which have been estimated at 50 per cent dependability. The normal value of run-off is the product of only a few years of availability of run-off. This explains why only very few and that too only minor irrigation projects have been taken up in Barmer. Even these schemes have suffered heavily resulting in irrigation facilities being available at very low levels.

Occurrence of Droughts

Having analysed the availability of rainfall and the limitations on the extent of irrigation facilities caused by the inadequacy of both ground and surface water resources let

us now look at the occurrence of droughts in terms of their frequency and the extent of loss they have caused when seen in terms of crop loss as compared to production levels of the normal years.

Barmer has been a victim of recurrent scarcity conditions as a result of continuous failure of rains. Almost every year various regions experience abnormal scarcity of water, food-grains and fodder. But it is only when these three scarcities are felt simultaneously that the State Government declares the year as a drought year and offers assistance of various types to the people to cope with the situation.

Although there is no proper record of droughts in the district it is all the same indicated by various sources that droughts have been a regular hazard in the district. The drought of 1812-13 is said to have been very severe and is still remembered as the year of great suffering. Then again there was a drought during 1895-96 when rainfall was highly inadequate. The worst drought recorded in the district was in 1899-1900. There was a complete dry spell and the conditions became so grave that the drought was termed 'Trikal' which means a triple famine of foodgrains, water and fodder. Large number of people were forced to migrate to other places alongwith their animals. Droughts affected the district dur-

ing 1936-37, 1938-39 and in 1940 as well when again the people were forced to migrate to Malwa and Gujrat.

Taking the post 1950 situation into consideration, as many as 13 years had to be declared as drought years in the space of three decades. These years are, 1950-51, 1960-61, 1964-1967, 1968-69, 1969-70, 1971-1974, 1975-76, 1977-78 and 1979-80. It can be observed that the occurrence of drought particularly in the last decade (1970-1980) is quite high. In fact, during the entire 50's only one year was a drought year thus there has been a concentration of drought years between 1960 to 1980 (12 years).

Between 1901 to 1980 the rainfall has been less than 75 per cent of normal in 29 years. Thus, 36 per cent years have had rainfall less than 75 per cent of normal. The worst affected tehsils being Sheo and Chohatan where the percentages have been as high as 45.5 and 42.5 per cent respectively.

Since 1972-73 five years have been drought years and during these years all the five tehsils of the district have been adversely affected. The severity of drought was worst in 1979-80 when all the villages were affected and least in 1977-78 when only around 42.5 per cent of the total villages were affected from drought.

Let us now turn our attention to the period between 1969-70 to 1979-80 and see the extent to which the agricultural production was affected as a result of droughts.

Table 3.6

Crop Yield in Different Years in Barmer District

Sl. No.	Years	Crops yield during the year in tonnes	Departure of yield from normal yield in tonnes	% of losses to normal yield
1.	1969-70	10306	- 195351.3	95.00
2.	1970-71	475878	270220.7	-
3.	1971-72	474047	268389.7	-
4.	1972-73	117718	- 87939.3	42.8
5.	1973-74	401096	195438.7	-
6.	1974-75	25697	- 179960.3	87.5
7.	1975-76	292507	87849.7	-
8.	1976-77	157674	- 47983.3	23.2
9.	1977-78	113691	- 91966.3	44.7
10.	1978-79	126336	- 79321.3	38.5
11.	1979-80	66280	- 139377.3	67.8
12.	Normal yield in Tonnes	205657.3		

From the time series data relating to agricultural production between 1969-70 and 1979-80, we have worked out the average production on the basis of a simple arithmetic mean. This average is being treated as the normal production of an average normal year and then we have calculated the extent to which actual agricultural production has fluctuated from normal production in any given year. The table brings out clearly the fact that in this eleven year period agricultural production has been below normal production in as many as seven years. Crop loss has been highest during 1969-70 when agricultural production has been the lowest at only 10306 metric tonnes. This gave a crop loss of 95 per cent. Likewise crop loss was very high in the year 1974-75 when the loss was 87.5 per cent. Heavy crop loss was also recorded in 1979-80 when production was below 50 per cent of the normal. In the remaining four years crop loss ranged between 23 to 45 per cent. In fact in a period of 11 years we have only 4 years which have been drought free and when actual agricultural production has been above normal.

In brief, Barmer district is stricken with all possible drought condition such as low and erratic rainfall, meagre irrigation and other natural condition of sandy and saline soils having extremely low moisture retaining capacity but a high degree of evaporation and percolation of water. As a result, occurrence of drought is natural recurring phenomenon which causes not only crop losses but also human sufferings.

Chapter-IV

AGRICULTURE

With over 90 per cent of the population living in the rural areas and over 80 per cent of the main workers engaged in agriculture the predominance of agriculture becomes self evident in Barmer. However, desert type soil, irregularity and low level of rainfall alongwith inadequate development of irrigation facilities together make conditions all the more difficult for agriculture to develop. The cultivators are engaged in subsistence farming and conditions are more or less stagnant and hardly exhibit any dynamic elements.

Land Use Pattern

The total geographical area of the district is 2817159 hectares. About half of the area is under cultivation, the actual figures being 44.85 per cent in 1970-71 and 49.31 per cent in 1979-80 respectively. Among the tehsils Chohatan had the highest percentage of net area under cultivation (62.24) whereas Shiv tehsil was the lowest with only 28.71 per cent net cultivated area. In the remaining three tehsils the percentage ranged between 51 to 58 per cent.

It is observed that fallows, both current and other, constitute a rather high proportion of the geographical area of the district and accounted for around 4 and 21

per cent respectively in 1970-71. By 1978-79 the area under current fallows had gone up to 9.5 per cent while other fallows had come down to around 11 per cent. Thus even in 1978-79, fallows accounted for around 20 per cent of the geographical area. Barmer tehsil ranks first with almost 26 per cent of the total area under fallows while in the case of Shiv tehsil fallows constitute only 9 per cent which is the lowest among all the five tehsils.

Cultivable waste lands also form a sizeable portion of the total geographical area and accounted for 15 and 13 per cent in 1970-71 and 1979-80 respectively.

The total cultivable area has been constant at around 85 per cent between 1970-71 and 1979-80. However, net sown area has wide fluctuation over the ten year period with the lowest being 33.71 per cent in 1974-75 and the maximum of 57.44 per cent in 1973-74. These fluctuations arise as a result of the irregularity in the rainfall and a high frequency in the occurrence of droughts. This shows the extent to which agriculture is depressed in the district. The same fact is brought out if we look at area sown more than once. The area sown more than once was only 0.51 per cent of the net sown area. The situation had only marginally improved by 1979-80 when the percentage had gone upto 1.11. The cropping intensity was only 101.11 in 1979-80. The development of irrigation

facilities too is inadequate since net irrigated area as a percentage of net area sown rose from 0.81 to only 1.66 per cent between 1970 and 1980. The percentage of gross irrigated to gross cropped area like wise registered an increase from 1.04 to 2.52 per cent during the same period.

With over 80 per cent of the geographical area being accounted for by the net area sown, fallows and cultivable waste it is obvious that forest land and pastures etc. cover a relatively lesser area under them. In fact only pastures with around 7 per cent area have an area of over five per cent from the remaining catagories of land use pattern.

Distribution of Land Holdings by Size Groups

Having seen the land use pattern of Barmer let us now analyse the data relating to size of land holdings, area under them, changes if any seen at two points of time and the land holding size in which these holdings are mainly concentrated. For this purpose we have taken the data given in the Census of Land Holdings for the years 1970-71 and 1976-77. The Census classifies holdings in twelve different size groups ranging from holdings below 0.5 hectares to holdings above 50 hectares. For the purpose of analytical convenience, however, we have clubbed together various size groups and have a final tally of only 3 size groups : upto 5 hectares, 5 to

10 hectares, and 10 hectares and above. In 1976-77 the district had a total of 127006 holdings of different sizes which covered an area of 2213986 hectares thereby yielding an average size of land holding at 17.43 hectares.

Table 4.1

Classification of Land Holdings by Size Groups

Categories	No. of holding			Operated area			Average size of land holding		
	1970-71	1976-77	% of variation	1970-71	1976-77	% of variation	1970-71	1976-77	
Upto 5 ha.	22174 (20.90)	30381 (23.92)	37.01	61844.19 (2.96)	75918.46 (3.43)		22.76	2.78	2.50
5 - 10 Ha.	20169 (19.01)	25811 (20.32)	27.97	148358.45 (7.09)	190710.97 (8.61)		28.55	7.35	7.39
Above 10 ha.	63747 (60.09)	70814 (55.76)	11.08	1881722.10 (89.95)	1947357.4 (87.96)		3.49	29.52	27.50
Total	106090	127006	19.72	2091924.74	2213986.83		5.83	19.72	17.43

Note : Figures in brackets are percentages to total.

Average size of land holding of Rajasthan are 5.46 and 4.65 in 1970-71 and 1976-77 respectively.

Table 4.2

Group, Number, Area and Average Size of Operational Land Holding
(Hectare)

Groups of Land Holding (Hectares)	No. of holding		% of Varia- tion	Operated Area		% of varia- tion	Average size of land holding		
	1970-71	1976-77		1970-71	1976-77		1970-71	1976-77	
	1	2	3	4	5	6	7	8	9
1. 0.50	989	4885	393.93	250.78	636.98	154.40	0.25	0.13	
2. 0.50 - 1.00	1470	1873	27.41	1106.33	1294.08	17.00	0.75	0.69	
3. 1.00 - 2.00	4463	4881	9.37	6845.36	7447.55	8.79	1.54	1.53	
4. 2.00 - 3.00	4754	5713	20.17	11899.59	14173.83	19.11	2.50	2.48	
5. 3.00 - 4.00	5494	6670	21.41	19236.49	23659.06	23.00	3.50	3.55	
6. 4.00 - 5.00	5004	6359	27.08	22505.64	28706.96	27.55	4.50	4.51	
7. 5.00 -10.00	20169	25811	27.97	148358.45	190710.97	28.55	7.36	7.39	
8. 10.00-20.00	26777	31784	18.70	361292.96	453807.01	25.61	13.49	14.28	
9. 20.00-30.00	15076	16235	7.69	314191.16	395995.60	26.04	20.84	24.39	
10 30.00-40.00	8683	9240	6.41	341346.20	316776.14	-7.20	39.31	34.28	
11 40.00-50.00	4990	5995	4.11	231760.03	230408.26	-0.58	46.44	44.35	
12 50.00 +	8221	7560	-8.04	633131.86	550370.57	-13.07	77.01	72.80	
TOTAL	106090	127006	19.72	2091924.74	2213986.83	5.83	19.72	17.43	

The maximum number of operational holdings were concentrated in the size group of ten hectares and above. They had around 60 per cent of the total land holdings in 1970-71. The remaining land holdings were almost evenly distributed in the two lower size groups with the size group below 5 hectares having a slightly higher percentage. This general pattern, as far as the ranking of the size groups is concerned, remained the same even in 1976-77 with the land holding group of 10 hectares and above being the predominant group. However, there was a decrease in the percentage from 60 to 55.76. This decrease was more or less proportionately divided in the remaining two size groups. Holdings below 5 hectares thus constituted 23.92 per cent while holdings between 5 to 10 hectares 20.32 per cent of the total land holdings.

Since bulk of land holdings were concentrated in the size group 10 hectares and above, it accounted for a very high total area under it. The percentage of area under these holdings to the total area was 89.95 per cent in 1970-71. Size group 5 to 10 hectares with 20.32 per cent holdings had only around 7 per cent of the total area under them while the size group below 5 hectares had slightly less than 3 per cent of the total area under land holdings. Looking at the area distribution among the three size groups between 1970-71 and

1976-77 one does not find much difference in the respective figures. Whereas there was a decline in the number and percentage of holdings above 10 hectares, in the case of area however there was a slight difference. The actual area under these holdings registered an absolute increase in the latter year whereas the percentage of area under them to total area declined marginally. In the case of the other two size groups both number of holdings and area as well as the corresponding percentages have registered an increase in 1976-77 as compared to 1970-71.

There has been a marginal decrease in the average size of land holdings for the district as a whole of slightly over two hectares by 1976-77. Looking at the three size groups individually we find the same pattern except in the case of size group 5-10 hectares in whose case there is no change between the two points of time. This reduction in the average size of land holdings could possibly be the result of fragmentation and sub-division of land holdings particularly in the two smaller size groups which together have registered an increase in holdings of 4.33 per cent in 1976-77 as compared to 1970-71. Although the average land holding size appears to be quite high even in 1976-77 but the advantages of this high average land holding size are lost on account of the low productivity of the sandy soil, irregular and insufficient rainfall as well as the low levels of irrigation.

Cropping Pattern

Let us now examine the cropping pattern of the district. Although a wide range of crops are grown in the district, most of them have only a negligible area under them. Thus we are left with only a few crops of significance. In fact as an individual crop Bajra alone stands out as a single major crop of prominence. The other crops included are Wheat, Pulses and Til which have a reasonable area under them although the area may itself be a very small percentage to the gross cropped area of the district.

Bajra is the principal crop and is grown extensively all over the district. Bajra requires relatively less water for cultivation and is, therefore, ideally suited for the district considering the typical conditions that prevail in Barmer. In 1970-71 the crop was sown on 72.38 per cent of the gross cropped area. Out of the total area under foodgrains Bajra alone accounted for over 95 per cent of the total area. In 1979-80, however, area under Bajra to the gross cropped area came down to around 60 per cent. Area under crops like Wheat and Pulses had gone up considerably as a result of which out of the total area under food crops the share of Bajra was reduced to 87.77 per cent. This general pattern is obtained

at the tehsil level as well and Bajra covers the maximum area under it out of the gross cropped area.

Table 4.3

Cropping Pattern of Barmer

(Area in Ha.)

Crop	1970-71	1979-80
Bajra	919175	867272
Maize	18	34
Juwar	2920	1111
Wheat	11799	28532
Barley	325	2697
Other Cereals and Millets	2	-
Gram	1151	5604
Moth	NA	68120
Moong	NA	14485
Other Pulses	11738	-
Total area under foodgrains	952528	988119
Fruits and vegetables	279	222
Chillies and spices	2629	17603
Oil seeds : (i) Ground-nut	75	-
(ii) Castor	180	199
(iii) Sesamum	13499	13455
(iv) Rape seed and Mustard	205	-
(v) Others	399	11559
Total oil seeds	14358	25213
Cotton and jute	12	25
Tobacco	36	-
Fodder crops	300020	424250
Total Non-food crops	314426	467049
Gross cropped area	1269862	1455168

Wheat is the other cereal which had over ten thousand hectares under it. The area under wheat was only 0.93 per cent of the gross cropped area and as such it can not claim to be among the important crops. But then it is the superior foodgrain grown there and its cultivation is mainly confined to areas where irrigation facilities are available. By 1979-80 area under wheat had nearly doubled. In 1970-71, out of the total area under wheat nearly 81 per cent was irrigated. The irrigated area came down to 50 per cent by 1979-80 which shows that the crop is being cultivated over unirrigated tracts as well since irrigation facilities are rather limited. One therefore feels the urgency to develop and exploit the ground water resources of the district. Crops in general and those crops whose water requirement is relatively high are suffering in particular as a result of scarcity of water.

Among the other foodgrains grown are pulses of which Moong, Moth and Gram are the main. However, pulses as a whole have only a small area under them. In 1970-71 area under pulses constituted only 1.44 per cent of the gross cropped area. By 1979-80, this percentage had shown an increase of around 4.5 per cent. Area under pulses had gone up from 18,289 hectares in 1970-71 to 88,209 hectares. Of this the maximum area was under Moth which alone accounted for 4.68 per cent of the gross cropped area (pulses as a whole 6.06 per cent).

Among the commercial crops of the district chillies and spices and oil seeds are important although the area under them is only a small percentage of the gross cropped area. Area under these two categories of cash crops was .20 and 1.14 per cent respectively in 1970-71. These percentages increased to 1.22 and 1.73 in 1979-80. Among oil seeds sesamum has the maximum area.

Details of the cropping pattern given so far bring out the fact that besides Bajra all other individual crops or categories of crops like pulses, oil seeds and spices etc. have but a very small area under them. This is so since the district has a very high area under fodder crops besides Bajra. Area under fodder has been around one-fourth of the gross cropped area at both points of time; the actual percentage being 23.63 in 1970-71 and 29.15 in 1979-80. Bajra and fodder crops, among which Guwar is important, together covered around 96 per cent of the gross cropped area in 1970-71. Although this percentage came down to 88.75 in 1979-80 yet the heavy dominance of these two continues. Consequently little area remains for the cultivation of other crops. This is mainly because both Bajra and fodder can be cultivated without water. If crops like wheat are to be introduced in the district on a large scale irrigation facilities will have to be extended. For this fuller exploitation of ground water resources is essential.

Crop-wise Productivity

We have so far tried to analyse the performance of agriculture with respect to the changes in the land use pattern, size of land holdings and the cropping pattern with the help of data pertaining to two points of time. We shall now look at the agricultural sector from the point of view of productivity which is being analysed with the help of average yield of the different crops. For this we will see the changes that have taken place within the district and how the district compares with the State as well as India as a whole.

Table 4.4

Crop-wise average yield of Barmer, Rajasthan and India
(Kilograms per ha.)

Crops	<u>BARMER</u>		RAJASTHAN 1978-79	INDIA 1978-79
	1970-71	1978-79		
Bajra	529	200	253	489
Wheat	1356	850	1444	1568
Juwar	342	70	401	792
Barley	306	560	1346	1172
Gram	868	500	909	745

The two years taken for this analysis are 1970-71 and 1978-79 details of which are given in Table 4.4. The district unfortunately presents a poor performance of agriculture based on the productivity of different crops. Bajra, for instance, which is the principal crop of the district showed a considerable decline in its average yield. The yield rates coming down from 529 Kgs. per hectare in 1970-71 to 200 Kgs. per hectare in 1978-79. The district was slightly behind the State and lagged behind considerably from the all India average yield of Bajra. The average yield of the State was 253 Kgs./Hect. and of the Country 489 Kgs./Hect. in 1978-79. The yield of the district was not even half the average yield of India. This itself is indicative of the performance of agriculture in Barmer since Bajra covered around 60 per cent of the gross cropped area in 1978-79.

The same results are obtained in the case of Juwar, Wheat and Gram among the food crops. In the case of each crop the average yield had registered a decline in 1978-79 as compared to 1970-71. Not only have the yield rates declined over the years, one finds a major difference between the yield rates of the State and the Country and the district. The district in fact does not have any crop whose yield rates come anywhere near those attained by either Rajasthan or India as a whole.

Barley is the single crop whose average yield per hectare was higher in 1978-79 as compared to 1970-71. However, it must be kept in mind that this crop does not have a substantial area under it.

On the whole therefore it is observed that the district has a much lower agricultural productivity than the State as well as the All India average and that the data have been indicating a declining trend in the levels of agricultural productivity. It has already been pointed out that between 1970 and 1980 as many as 6 years have been identified as drought years with the result that agriculture has been constantly suffering as a result of the vagaries of nature.

Inputs and Other Facilities

(a) Agricultural Tools and Implements

Agricultural practices are carried out with the use of traditional technique and this is brought out with the predominance of ploughs and an insignificant number of modern tools and implements like tractors and pump sets. Tractor use is extremely limited since the entire district has a total number of 429 tractors only. They constitute barely 1.73 per cent of the total tractors in the State. Similarly there are in all 1434 oil engines and another 718 pump sets in the district and are used for lifting ground water for drinking and agricultural purposes (Table 4.5).

Table 4.5

Use of Agricultural Implement in Barmer District
and in Rajasthan

Sl. No. Implement	Barmer Actual No.	Rajasthan Actual No.
1. Plough	145095	2740569
2. Cart	7868	887058
3. Tractor	429	24768
4. Oil Engine	1434	85513
5. Electric Pump	718	82918

(b) Area Under High Yielding Varieties

Wheat and Bajra are the only two crops where the use of high yielding variety seeds are being used. In 1976-77 586 hectares were under high yielding varieties in the case of wheat which was only 3.77 per cent of the actual area under wheat. Similarly area under high yielding variety Bajra was only 4200 hectares which worked out to only 0.59 per cent of the total cultivated area under Bajra. By 1979-80 the HYV area of wheat had increased to 2127 hectares while that under Bajra to 20400 hectares and this worked out to 7.45 and 2.35

per cent of the total area under wheat and bajra respectively. Thus we find a slight improvement in the use of high yielding varieties although the use is only to a limited extent. For the cultivation of these high yielding varieties the Government had distributed 97.2 and 60.95 metric tonnes of wheat and bajra seeds respectively.

(c) Fertilizer Use

Fertilizer use is a function of the net irrigated area as well as the use of high yielding variety seeds. As the district has low level of irrigation and a small area under high yielding varieties, its use of fertilizers too is rather limited. In 1979-80 the total consumption of chemical fertilizers in the district was only 355.8 metric tonnes which works out to 0.24 Kg. per hectare of gross cropped area. Even if we calculate fertilizer use per hectare of the gross irrigated area the consumption works out to only 9.69 Kilograms and this too is extremely low. The main chemical fertilizer used is ammonium sulphate.

(d) Godowns and Stores

The district has 16 godowns and warehouses for storing agricultural produce and are mainly controlled by co-operatives. Shiv and Chohatan tehsils have one godown each while the remaining are almost equally distributed in the remaining three tehsils.

The storage capacities range from a minimum of 250 to a maximum of 5000 metric tonnes. However most godowns have a capacity of either 1000 or 1500 metric tonnes. There are only two agricultural mandis in Barmer which reflects the low levels of agricultural production and yield and the heavy subsistence orientation of agriculture on the whole in the district.

The agricultural sector of the district being dependent on nature is extremely backward and presents some kind of traditional and stagnant situation wherein it only serves the purpose of subsistence. The technical conditions of production do not show any kind of dynamism and entrepreneurship required for agricultural development. This seems to be on account of nature being the predominant force in determining the process of agricultural development.

Chapter-V

ANIMAL HUSBANDRY

In a district which offers little scope for agricultural development and that too with over 90 per cent of the population being agrarian in nature, animal husbandry occupies a prominent position in Barmer district. The rural population depends heavily on livestock either as a primary or secondary source of subsistence earnings. According to the livestock Census of 1977 the livestock population stood at 25.32 lakhs in Barmer and accounted for 6.12 per cent of the total livestock population of the State. Among the tehsils Barmer ranks first while Siwana has the lowest livestock population. The percentages of livestock to total livestock of the district in these two tehsils are 40.88 and 9.06 respectively. Poultry farming does not seem to have attracted the attention of the people since its development is insignificant there.

If we look at the livestock population in the Census years 1956 (17.31 lakhs), 1961 (21.66 lakhs) and 1966 (26.21 lakhs) we find that there has been a steady increasing trend of growth in the livestock population of the district. However, there has been a decline after 1966 as is evident from the figures of 1972 (19.74 lakhs) and the latest figures of 1977 (25.32 lakhs). This decline has been primarily as a result of droughts whose frequency has been rather high between

1966 and 1977, and these took a heavy toll of livestock reducing their number by almost one-fourth between 1966 and 1972. All the same the population of goats has not been adversely affected even during this period and consequently there has been a positive growth all along from 1956 upto 1977. The growth rate of total livestock population is erratic varying from 28.26 per cent (1972-77) to -24.67 per cent (1966-72). In the case of goats also the growth is pretty erratic and has been particularly low in the two Census years after 1966 being only 3.98 per cent (1966-72) and 1.88 per cent (1972-77).

Among the existing livestock in the district milch cattle as well as female buffaloes are of great importance since they produce milk and their products which are primarily used for domestic consumption, and for exchange in the market in the case of a surplus. The male cattle as well as buffaloes are used for draught purpose and for transportation in the rural areas. There will hardly be a household which does not have milch cattle and bullocks. Milch cattle and buffaloes together number 2.03 lakhs and they together account for around 8 per cent of the total livestock population. The highest number of milch cattle is found in Barmer tehsil which alone accounts for 39.23 per cent of the total milch cattle of the district. Siwana has the lowest percentage (7.72) while Shiv

and Chohatan tehsils have around 15 to 18 per cent. Female buffaloes are relatively few in the district but among the tehsils Siwana accounts for the maximum number, being 33.91 per cent of the total female buffaloes of Barmer. It is closely followed by Barmer and Pachpadra tehsils each of which has around 27.5 per cent of the total buffaloes in Barmer as a whole.

Goats and sheep are the other important animals. In fact as far as their numbers are concerned they constitute a very high percentage of the total livestock in the district. It is a known fact that both of them particularly goats are above to survive even when conditions are adverse, thus it is relatively easy to maintain them. They have their utility from the point of view of supplying wool for the woollen industry. Goats are also useful as their milk is used for human consumption. According to the 1977 Livestock Census Barmer had 11.09 lakh goats and 8.47 lakh sheep. They constituted 43.80 and 33.45 per cent respectively of the total livestock population. They, therefore, together account for over three fourths of the total livestock population of the district. Looking at the tehsil-wise figures Barmer tehsil stands out as the most prominent with respect to goats and this tehsil

Table 5.1

Livestock 1977 Tehsil-wise Information, District Barmer

District/ Tehsil	Cattle				Buffaloes				Total	Sheep
	More than 3 years Male	More than 3 years Female	Below 3 years Male + Female	Total	More than 3 years Male	More than 3 years Female	Below 3 years Male + Female	Total		
1	2	3	4	5	6	7	8	9	10	
District Barmer	67636	183102	136914	387652	2664	13866	12534	29064	847011	
<u>Tehsils:</u>										
Barmer	22714 (33.58)	74189 (40.53)	54075 (39.50)	150978 (38.95)	1023 (38.40)	3845 (27.72)	3008 (24.00)	7876 (27.10)	370917 (43.79)	
Shiv	7805 (11.54)	34253 (18.72)	18384 (13.42)	60438 (15.59)	154 (5.78)	76 (0.55)	99 (0.79)	329 (1.13)	148602 (17.54)	
Chohotan	4355 (6.44)	31540 (17.23)	24539 (17.92)	60442 (15.59)	713 (26.76)	1375 (9.92)	1114 (8.89)	3202 (11.02)	115344 (13.62)	
Siwana	16525 (24.43)	14594 (7.94)	16369 (11.96)	47488 (12.25)	440 (16.52)	4702 (33.91)	4614 (36.81)	9756 (33.57)	78422 (9.26)	
Pachpadra	16237 (24.01)	28526 (15.58)	23547 (17.20)	68310 (17.62)	334 (12.54)	3868 (27.90)	3699 (29.51)	7901 (27.18)	133726 (15.79)	

Contd....

Table 5.1 (contd..)

District/ Tehsil	Goats	Horse		Donkeys	Camels	Pigs	Total livestock population	Poultry		Total livestock + Poultry
		Ponies Mules						Ducks	Fowl	
1	11	12	13	14	15	16	17	18	19	20
District										
Barmer	1109506	2461	41049	115543	27	2532313	11	5939	5950	2538263
<u>Tehsils:</u>										
Barmer	431138 (38.86)	739 (30.03)	13754 (33.51)	59773 (51.73)	27	1035202 (40.88)	-	2222 (37.41)	2222 (37.34)	1037424 (40.87)
Shiv	185502 (16.72)	569 (23.12)	11501 (28.02)	11903 (10.30)	-	418848 (16.54)	-	817 (13.76)	817 (13.73)	419665 (16.53)
Chohatan	274315 (24.72)	971 (39.46)	12324 (30.02)	32756 (28.35)	-	499346 (19.72)	-	788 (13.27)	788 (13.24)	500134 (19.70)
Siwana	89037 (8.03)	92 (3.74)	715 (1.74)	3447 (2.98)	-	228957 (9.04)	11	915 (15.41)	926 (15.56)	229883 (9.06)
Pachpadra	129514 (11.67)	90 (3.65)	2755 (6.71)	7664 (6.63)	-	349960 (13.82)	-	1197 (20.15)	1197 (20.12)	351157 (13.84)

Figures in brackets are percentages to the district totals.

Source : Livestock Census 1977.

alone has 38.86 per cent of the goats of the district and is followed by Chohatan (24.72 per cent). Siwana with 8.02 per cent occupies bottom place.

Barmer is again the first ranked tehsil as far as sheep are concerned and the tehsil has 43.80 per cent of the total sheep population of the district. Shiv and Pachpadra follow with 17.5 and 15.6 per cent respectively while Siwana is again ranked last with 9.25 per cent.

Since it is relatively easy to breed goats and sheep the State Government is giving various incentives for the promotion of their breeding in Barmer. The Central Government has laid great emphasis particularly during the Sixth Five Year Plan on the removal/reduction of unemployment. Accordingly, under the various programmes like SFDA, CAD, DPAP and IRDP various schemes have been initiated for the upliftment of the rural poor. Under the animal husbandry programmes of 1981-82 as many as 250 cow units, 56 she-buffaloe units, 510 sheep units and 80 goat units were provided whereby 896 families identified from those living below the poverty line were benefited. Efforts are being made to provide the beneficiaries with better quality of cattle and goats etc.

Table 5.2
Animal Husbandry
Action Plan for 1981-82 for the District Barmer

	Total Physical	Financial requirement in (lakh)					Others		Grand total	Families to be benefited		
		Subsidy (IRD)	Co-op.	Credit	Comm-ercial	Total	Subsidy	Loan		Total	S.C.	S.T
1. Cow Unit	250	2.25	3.25	1.40	4.65	0.60	-	0.60	7.50	250	100	50
											(40%)	(20%)
2. She-buffaloes Unit	56	0.84	1.22	0.52	1.74	0.22	-	0.22	2.80	56	22	12
											(39.28)	(21.49)
3. Sheep Unit	510	3.43	12.07	5.17	17.24	0.91	-	0.91	21.58	510	204	102
IRP SLPP	-	-	-	-	-	6.22	-	6.22	6.22	-	(40.00)	(20.00)
4. Breeding Bull*16	80	0.64	-	-	-	-	-	-	0.64	-	-	-
5. Goat Unit	80	0.72	1.05	0.44	1.49	0.19	-	0.19	2.40	80	32	16
											(40.00)	(20.00)
6. Cattle Insurance	-	0.58	-	-	-	-	-	-	0.58	-	-	-
TOTAL	896	8.46	17.59	7.58	25.12	8.14	-	8.14	41.72	896	358	180
											(39.95)	(20.09)

* Not included in the total.

Source : IRDP, Barmer 1981-82.

Table 5.3

Livestock Population of District Barmer

	Cattle							Young stock 3 years and below	Total
	Male over 3 years			Female over 3 years					
	Breed- ing	Work- ing	Others	In Milk	Work- ing	Dry	Others		
0	1	2	3	4	5	6	7	8	9
<u>1977 Census</u>									
Barmer	1011	64911	1714	98238	34	65814	19016	136914	387652
<u>1972 Census</u>									
Barmer	366	35361	139	52176	82	31638	54	59810	179626
<u>1977 Census</u>									
Total Rajasthan	13588	3933194	61759	2056413	5657	2400851	399077	4025760	12896299
Growth rate in district Barmer 1972-1977	176.23	83.57	1133.09	88.28	(-)	58.54	108.02	35114.81	128.91
% of total livestock in Rajasthan 1977	7.44	1.65	2.78	4.78	0.60	2.74	4.76	3.40	3.01
Category-wise % of district Barmer 1977	0.26	16.74	0.44	25.34	.008	16.98	4.90	35.33	100.00

Source : Livestock Census.

Contd.....

Table 5.3 (contd..)

	Buffaloes										Young stock 3 years and below	Total
	Male over 3 years					Female over 3 years						
	Breed- ing	Working	Others	In milk	work- ing	Dry	Others					
0	10	11	12	13	14	15	16	17	18			
<u>1977 Census</u>												
Barmer	171	1882	611	8915	18	3605	1324	12534	29064			
<u>1972 Census</u>												
Barmer	78	382	17	4489	7	2661	1	5932	13567			
<u>1977 Census</u>												
Total Rajasthan 1977	13091	153810	23574	1350662	4399	1168303	261457	2096684	5071980			
Growth rate in district Barmer 1972-1977	119.23	392.67	3494.12	98.60	157.14	35.48	132300.00	111.29	114.23			
% of total livestock in Rajasthan 1977	1.31	1.22	2.59	0.66	0.41	0.31	0.51	0.60	0.57			
Category-wise % of district Barmer 1977	0.59	6.48	2.10	30.67	0.60	12.42	4.55	43.13	100.00			

Source : Livestock Census.

Camels have their own importance in the desert district of Barmer. The district had 1.16 lakh camels in 1977 and accounted for around 4.5 per cent of the total livestock population. They are being used primarily for the purpose of transportation. Barmer tehsil accounts for slightly over half the total camel population of the district. Siwana on the other hand has the least number of camels among all the tehsils.

The remaining animals constitute an insignificant proportion of the total livestock population. Poultry farming, as has been pointed out earlier, could not be made popular and the district has only a very small number of birds.

On the whole we see that the district has a high population of livestock which helps a great deal in supplementing the low agricultural incomes of the people. Barmer tehsil in particular stands out as a very significant tehsil from the point of view of livestock as it has the highest number of milch cattle, goats and sheep and they form an important part of rural life.

Veterinary Facilities

It is rather strange that a district like Barmer, which has a total livestock population of above 25 lakhs, should have only 9 veterinary hospitals and just one dispensary in the whole district. The dispensary is in Siwana which

has the least population of livestock. Besides these facilities the district has four artificial insemination centres, two mobile veterinary units and one key village unit. The mobile units are shared by Barmer and Balotra blocks and the key village unit is in Balotra.

Table 5.4

Livestock Facilities in Barmer District
1979-80(Blockwise)

District/ Block	Facilities							
	Hospi- tal	Dis- pen- sary	Key vill- age unit	Mobile veter- inary unit	Arti- fici- al in- semina- tion centre	Cattle breed- ing Bull Rear- ing farm	Cattle castr- ated	Per- cen- tage
Barmer District	9 (100.00)	1 (100.00)	1 (100)	2 (100)	4 (100)	-	10369	100.00
Bayatu	1 (11.11)	-	-	-	NA	-	1818	17.53
Barmer	1 (11.11)	-	-	1 (50.00)	NA	-	1834	17.69
Balotra	2 (22.22)	-	1 (100.00)	1 (50.00)	NA	-	1873	18.06
Chohatan	1 (11.11)	-	-	-	NA	-	551	5.31
Dhosimona	1 (11.11)	-	-	-	NA	-	979	9.44
Siwana	2 (22.22)	1 (100.00)	-	-	NA	-	2070	19.96
Sivadari	-	-	-	-	NA	-	327	3.15
Shiv	1 (11.11)	-	-	-	NA	-	917	8.84

Note : Figures in brackets are percentages to total.
NA = Not available.

Source : Directorate of Economics and Statistics, Rajasthan,
Jaipur.

The veterinary services of the district are highly inadequate and efforts have to be made to extend them ^{a larger} over ~~area~~ such that they are better available. On an average at present we have nearly three lakhs of livestock per veterinary hospital. Moreover the problems of the remote areas is that in the absence of such services within easy reach many heads of cattle, goats and sheep perish simply as a result of lack of a veterinary surgeon. In view of the various animal husbandry schemes initiated under the integrated rural development programme one feels that the government should take concrete steps in this direction as well.

In a district like Barmer which has such a large number of cattle the Government should ensure that pastures are developed as far as possible. Of course, the type of soil does act as a constraint to a certain extent. But in case not much headway can be made with respect to their development then the government must think in terms of making fodder available in ample quantity around the year and particularly during years of drought. At present the people are forced to migrate outside the district, (even outside the State) during periods of scarcity.

The district has 63 milk supply centres in the co-operative sector. Their working however is not satisfactory which can be seen from the fact that at Balotra the Co-operative unit has been running at a loss although there was ample scope for the development of a dairy unit. The Societies should therefore make every possible effort to ensure that their working conditions improve. Similarly the district also has 40 sheep breeding units as well. While they ensure the supply of better quality sheep to the members they should also undertake the task of marketing of raw wool. This will ensure that the producers of raw wool get a proper price for their products. Provided some of these aspects are properly looked into there is every possibility to improve the scope of animal husbandry in Barmer.

Livestock does not appear to be only a handmaid of agriculture but also an integral of rural life itself. Bovines, goats and sheep in particular are the other source of subsistence living for the people in the rural areas of the district. It appears to be one of the most viable alternatives for district development.

Chapter-VI

INDUSTRIES

The district has a low industrial base. Inadequate development of the industrial sector can be seen from the fact that the district has no large or medium scale industry. There were, however, 28 registered factories working in Barmer in 1979. The major concentration was in oil extraction and printing. Each industry had eight units. These two together thus accounted for 57 per cent of the total registered factories in the district. The other units existing in the district were engaged in spinning and dyeing of cotton. They together had seven units. Sawing mills, milk cooling plant, and an iron industry were the others under operation. The picture of district's industrialisation was even more bleak in 1971 when there were a total of only 11 registered units. One, therefore, witnesses a change for the better by 1979 although the improvement is not substantial.

Employment is another indicator which reflects the low level of industrial development. According to the occupational structure given in the 1981 Census (Provisional) 2.77 per cent of the main workers are engaged in household manufacturing. The provisional figures do not give details of workers engaged in non-household manufacturing activities but even the percentage of 'other workers' is only 15.72 and these

include workers engaged in construction, transport and communication, trade and commerce and services etc., non household manufacturing apart.

The small scale and cottage industries of Barmer are substantial in number. There were as many as 712 units as on March 1981 and employed a total of 4584 persons. Thus average employment per unit works out to be 6.42. These units had a fixed investment of Rs.16.30 lakhs. The details are given in the table No.6.1. These seem to provide the main industrial base of the district.

The most prominent type of small scale industries fall in the category of food products, textile products and leather and leather products. They constitute 14.75, 49.01 and 23.17 per cent of the total units respectively. They are employing 15.49, 56.54 and 17.60 per cent of the total workers engaged in the cottage industries. Average employment of these industry groups works out to be 6.76, 7.42 and 4.89 persons respectively. In 1971 the district had only 103 small scale units. Thus small scale industries have registered a very high growth and this apparently is a good sign since their growth can definitely play a significant role in easing the burden on agriculture.

Table 6.1

Details of Small Scale Industries as on March 1981
in Barmer District, Rajasthan

No.	Type of Industries	No. of unit	Fixed invest- ment in ('000 ')	Employ- ment
1.	Manufacturing of food product	105	62	710
2.	Manufacturing of cotton textiles	3	105	18
3.	Manufacturing of wool, silk and synthetic fibre textile	4	40.3	49
4.	Manufacturing of textile products	342	11389.914	2525
5.	Manufacturing of wood and wood products (Furniture and Fixtures)	10	116.5	55
6.	Manufacturing of paper and paper product and printing	6	185.627	17
7.	Manufacturing of leather and leather base products	165	1712.65	807
8.	Manufacturing of rubber, plastic petroleum and coal products	5	259	35
9.	Manufacturing of chemical products (Exports products of petroleum and coal)	12	1126.4	57
10	Manufacturing of non-metallic mineral products	16	480.677	142
11	Basic metal and alloy industries	11	72.1	40
12	Repairing works	31	699.3	126
13	Others	1	20	3
TOTAL DISTRICT		712	16299.468	4584

Source : C.W.C. Report, New Delhi, August 1982.

Among the small scale industries, units of salt industry are the most important in the food products group. Dyeing and printing of textiles is the oldest cottage industry of the district and the maximum units are centred around Balotra where the chemical composition of water is most suited for the purpose. The tie and dye saris of the district are famous and have a wide market outside the State as well. In fact a lot of investment is being financed by middle men who are supplying cloth, dyes and other chemicals alongwith finance and are in turn taking the entire production for sale either within or outside the State.

Weaving is also an important cottage industry and this includes production of cotton cloth made from locally available cotton and rough woollen/cloth and blankets made from wool produced within the district as well as 'Jat patties' from goat hairs.

The third prominent cottage industry is the leather tanning and leather products units. The raw material is available in adequate quantity since the district has a large livestock population.

The other small scale industries are of a diversified nature and include manufacture of bangles, bidis, pottery, rubber and plastic products, paper and printing and wood and

wood products etc. These village and cottage industries are being provided help by the Khadi Gramudyog Board which not only makes finance available to them on easy rates but also purchases the finished products of these units.

While these small scale units provide some sort of industrial base in the district, efforts have been lacking on the part of the Government in improving the production processes of these traditional industries. Similarly in some areas there are rich clay deposits and also availability of water. Yet the pottery industry, which has a reasonable scope, has not been developed properly. At the same time the district has large bentonite and salenite deposits and need to be exploited fully.

With a large goat and sheep population there seems scope for the establishment of a woollen unit on a large scale. Provision will have to be made such that raw material supplies are available on time and also in sufficient quantity. Any shortfall could even be met from outside purchase.

The large population of livestock also suggests that there should be a possibility for starting a bone meal unit within the district.

Tanning of leather and production of leather products can also be taken up in the large or medium scale sector. At present the activity is confined to the small scale and cottage industry level only.

These are some of the industry groups in which the Government ought to take initiative since these are basically resource based industries for which the resources too are available within the district itself. In case there is a dearth of entrepreneurial potential then the best alternative would be to start running units in the public sector.

The existing units are facing power problems. Efforts have to be made to increase the power supply so as to meet the increasing demand of these industrial units.

By and large we may say that even though the district has a low industrial base at present primarily centred around its small scale and cottage industries, yet the industrial potential keeping in view its own natural resources has not been tapped properly and that there is scope for further development, provided concerted efforts are made in this direction.

Chapter-VII

ECONOMIC AND SOCIAL INFRASTRUCTURE

We shall in this chapter focus our attention on the development of infrastructure facilities like power, roads, financial and other institutions and social services like education, health and drinking water facilities and see how far they are either contributing towards development in general or are posing problems. All these infrastructure facilities involve very heavy investments and over the years they have become the responsibility of the Government. Thus inadequacy in their development would mean that the government needs to put in a greater effort for their development.

Power

Power plays a vital role in economic development in general. Till as late as 1954 Barmer was not electrified. The first thermal power station was installed at Barmer in 1954. Whose capacity was 22 KW. Then in 1958 a 95 KW power station was opened in Balotra. Barmer in 1959 had another 200 KW thermal power station. At present, however, the Barmer and Balotra power stations are standbys only and power is being supplied to the district from the Chambal Hydel System through the Jalor and Jodhpur thermal transmission network.

Being a late starter, the district made little progress in this field till the end of the Second Five Year Plan and till then the sole beneficiaries were the Towns of Barmer and Balotra. Even after that the pace has been slow such that upto March 1981 only 89 Towns and villages have been electrified. Thus even as late as 1981 only around 10.6 per cent of the towns and villages of Barmer were electrified and this is indeed a rather low percentage. The details of electrification tehsilwise are indicated in the table below:

Table 7.1

Tehsilwise electrification in Barmer as on March 1981

Tehsil	Total No. of inhabited towns and villages	No. of towns and villages electrified	Percentage to total
Barmer	376	12	3.19
Shiv	76	9	11.84
Chohatan	142	5	3.52
Pachpadra	157	35	22.29
Siwana	88	28	31.82
DISTRICT TOTAL	839	89	10.61

It is obvious from the table that Pachpadra and Siwana are the only two tehsils which have a reasonable

percentage of electrified villages. These two tehsils taken together account for 70 per cent of the total electrified villages as well. The total consumption of electricity in 1976-77 was only 13.33 MKWH units and this gives a per capita consumption of barely 11.79 KWH (based on population of 1981).

The power consumed for domestic use is only 8.5 per cent of the total consumption (1976-77). The maximum use is for irrigation purposes (49.49 per cent) followed by industries (13.55 per cent). The State as a whole uses 19 per cent for irrigation and nearly 60 per cent for industrial use. This shows the extent to which the use for industrial purposes is low in the district. Part of this is, of course, accounted for by the fact that the district has a rather low industrial base but even the existing units are facing power shortages since the overall availability is rather low in the district. Lack of power supply is thus a bottleneck in economic development.

Development of Roads and Railways

Development of roads has been rather slow as was the case with power. The district has extensive sand terrains which makes construction of roads difficult. Moreover the population is very thinly scattered and the average distance

between two villages is very high thus the length of roads per hundred square kilometers of area and per thousand of population in 1981 was only 9.6 Kms and 2.44 Kms respectively which is extremely low. The total length of roads in the State was 2723 Kilometers in 1981. The inadequate development of roads can be seen from the fact that in 1976-77 only 16.73 per cent of the inhabited villages were linked by roads.

The main national highway No.15 connecting Amritsar to Kandla passes through the district. Besides this, State Highways also pass through Barmer. The length of various highways and other roads and their classification by surface type is given in the tables below:

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Table 7.2

Length of National and State Highways and Other Roads in Barmer, 1981

(Kms.)

Year	National Highway	State Highway	Major Distt. roads	Other Distt. roads	Village roads	Boarder roads	Total
1981	189	277	322	758	513	664	2723

Table 7.3

Classification of Roads by Type of Surface (1976-77)

Year	National High- way	Painted roads	Metall- ed roads	Gravel roads	(Kms.)	Total
					Dressed upto track	
1976-77	189	1189	338	887	72	2675

The first railway line was opened between Luni and Pachpadra in 1887 covering a distance of approximately 100 Kilometers. The main line at present links Luni junction to the Pakistan Boarder and covers a distance of 259 Kms. The district is connected by rail only from Jodhpur and has in all 30 railway stations.

Financial Institutions

The district in 1979-80 had 26 branches of Commercial banks. Considering the liberal policy adopted by the RBI for the opening of rural branches the district has relatively fewer branches. The total deposits of these branches amounted to Rs.618 lakhs and against it they had disbursed loans to the tune of Rs.337 lakhs. The credit deposit ratio works out to 54.53 per cent. Bank branches per lakh of population works out to 2.29.

Besides these Commercial bank branches the district also has one Central Co-operative bank with a total membership of 326. It is operating with a working capital of Rs.5.91 crores. By June 1980 it had given loans worth Rs.4.22 crores while the amount outstanding was Rs.3.96 crores.

For the benefit of the cultivators, particularly the small and marginal farmers, the district also has a primary land development bank which provides easy credit to the farmers for the purchase of seeds and fertilizers etc. and other agricultural implements so as to improve the mode of production. The land development bank has an overall membership of 5594 and had a total working capital of Rs.82.87 lakhs as on 30 June 1982. It had advanced loans worth rupees 43.66 lakhs to its members.

Co-operative Societies

The various types of Co-operative Societies in the district number 526 in all, and have an overall membership of 1.30 lakhs and a share capital of Rs.180.56 lakhs. Broadly speaking they may be classified into three broad categories viz those assisting agriculture, those assisting animal husbandry and others which have diverse objectives. The details of Cooperative Societies is presented in Table 7.4.

Table 7.4

Co-operative Societies in Barmer

Particulars	Central Co-operative Bank	FLD bank	Agricultural credit Societies	Non-agricultural credit Societies	Marketing Societies	Milk supply	Sheep Breeding	Farming societies
1	2	3	4	5	6	7	8	9
No. of Societies	1	1	220	12	3	63	40	9
Member	326	5594	109285	719	734	4986	963	146
Loan advanced	422.04	43.66	395.24	0.20	1.08	-	0.13	-
Loan recovered	349.41	11.00	254.57	-	-	-	-	-
Loan outstanding	396.48	71.43	396.19	0.31	1.08	-	0.13	0.01
Working capital	591.39	82.87	569.21	0.68	21.79	3.29	0.41	0.27

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Contd....

Table 7.4 (contd..)

Particulars	P. Consumers Stores	Housing Societies	Weaver and spinning Societies	Industrial Societies	Labour contact ties under liquidation	Societies Others	Total	
	10	11	12	13	14	15	16	17
No. of Societies	20	18	38	52	24	23	2	526
Member	3167	584	1113	1035	458	1000	317	130427
Loan advanced	-	1.36	-	-	0.20	-	-	863.91
Loan recovered	-	0.04	-	-	-	-	-	660.02
Loan outstanding	-	2.38	-	-	0.21	-	-	868.22
Working capital	4.08	3.08	11.74	12.43	4.52	4.25	1.07	1311.08

As can be expected the predominance is of those Co-operatives that are linked with agriculture. They constitute 42.20 per cent of the total Cooperative Societies of Barmer and account for 88 per cent of the total members. They are primarily engaged in providing agricultural credit to the cultivators and have a total working capital of Rs.12.43 Crores against which the advances were Rs.8.41 crores.

Among the Cooperative Societies in the animal husbandry sector there are two main types. Societies for supply of milk numbering 63 and sheep breeding societies which are 40 in the district. These two jointly are 19.5 per cent of the total and they have 4.56 per cent of the total number of members.

The remaining 38.3 per cent societies are of a diversified nature among which the weaving and spinning societies and the industrial societies form the main bulk (17 per cent of total), and have a total membership of 2148. They however have a low working capital.

Education

It has already been pointed out elsewhere in the report that Barmer has the lowest literacy rates in Rajasthan and that in the case of rural females the literacy rate has shown a marginal decline in 1981 as compared to 1971. Let us now look at the educational facilities that exist in the district.

Table 7.5

Details of Schools, Teachers and Enrolment in Barmer (1979-80)

	School			College		Total
	Primary and pre-primary school	Middle	High Secondary and secondary school	Professional Education	General education	
Rajasthan	21313	5175	2168	149	120	28925
Barmer	700	135	40	1	1	877
Enrolment:						
Boys	28627 (83.96)	17338 (84.63)	9224 (89.25)	68 (90.67)	790 (97.65)	56047 (85.18)
Girls	5468 (16.04)	3150 (15.37)	1111 (10.75)	7 (9.33)	19 (2.35)	9755 (14.82)
Total	34095 (100.00)	20488 (100.00)	10335 (100.00)	75 (100.00)	809 (100.00)	65802 (100.00)
Teachers	857	917	528	9	34	2345
Student/Teacher Ratio	39:78	22.34	19:57	8:33	23.79	28.06

Note : Figures in brackets are percentage of sex-wise enrolment.

Source : District Statistical Handbook, Barmer, Directorate of Economics and Statistics, Rajasthan, 1981.

The district had a total of 700 primary schools in 1979-80. Although this means that not all the 837 inhabited villages have a primary school each yet the number is large enough to ensure at least basic education to a larger percentage of the population than that reflected in the literacy rates of the district. The total enrolment in the primary schools is 34,095 and as can be expected the enrolment of girls in this total is barely 16 per cent. The district also had 135 Middle schools and 40 Higher Secondary Schools where again the enrolment of females is around 15.5 and 11 per cent respectively.

With respect to higher education the district is rather deficient with only one college and one professional institution. Here again the conservative attitude towards education of females is evident from the fact that out of a total of 800 students in the college, there were only 19 girl students which constituted a bare 2.38 per cent of the total enrolment.

We have taken the absolute number of school going students at the primary, middle and higher secondary levels and assume that this number was the same in the previous year as well, so as to use it as a proxy for calculating the drop out rate among students. It is observed that there is

a successive drop in the number of students in the middle level as compared to the primary and in higher secondary as compared to the middle level. This is suggestive of the fact that the drop out rate among both boys and girls is quite high in Barmer.

Medical and Health Facilities

As has been the case with respect to the infrastructure facilities discussed above Barmer once again falls in the category of the less developed districts with respect to medical and health facilities. The entire district has only two allopathic hospitals and one Ayurvedic hospital and all are in the urban areas. The plight of the people, particularly of rural origin, can be evident from this low number and from the fact that rural population constitutes over 90 per cent of the total population. A total of 3 hospitals in the district with a population of over 11 lakhs presents a rather poor picture as far as the development of medical facilities is concerned.

The rural areas mainly depend upon the allopathic dispensaries (17), primary health centres (8) and the Ayurvedic dispensaries (54) and 7 welfare centres for their day to day medical requirements.

Table 7.6Medical Facilities in Barmer
1979-80

Sl.No.Type of Medical Facilities	Rural	Urban	District Total
1. Hospital	-	2	2
2. Dispensary	17	2	19
3. Primary Health Centre and	8	-	8
4. Maternity/Child Health Centre	1	2	3
5. Total	26	6	32
6. Family Welfare Centre	7	3	10
State Ayurvedic and Unani Hospital:			
7. Hospital	-	1	1
8. Dispensary	54	3	57
9. Grand total	87	13	100

Source : District Statistical Handbook, Barmer, 1981.

While medical facilities are obviously lacking in the district from the point of view of number of hospitals and dispensaries the same picture also emerges when one looks at the total number of Doctors available in the district. The hospitals and dispensaries are controlled by a single doctor since there are in all 19 doctors and an equal number of hospitals and dispensaries. With a very high number of persons relying per hospital or dispensary the Government

should at least see to it that the number of doctors is sufficiently increased. One doctor alone can hardly be expected to do justice to the total number of patients who visit these hospitals/dispensaries daily.

Drinking Water Facilities

Wells are the main source of drinking water in Barmer. However, clear and sweet potable water is difficult to obtain since the district has desert type of soil and salinity in water is of a high degree in most places. As a consequence of the reoccurrence of drought and with water resource potential scarce and not adequately tapped there is considerable problem of drinking water which affects both human and livestock population of the district as the wells dry up.

It was during the first two Five Year Plans that attention was paid to the extension of drinking water facility. Balotra was the first town to benefit and by 1958-59 it started receiving potable water. It was during the second plan that the scheme was extended to Barmer as well although the scheme was completed there in the next plan.

The Public Health Engineering Department and the State Ground Water Department have been working jointly to solve the drinking water problem and their schemes are under active progress. They had proposed a Master Plan from April

1974 to March 1979. This master plan had identified a total of 781 villages^{as} problematic with the villages having different types of problems like brackish area, water borne disease and difficult areas etc. Thus nearly 93 per cent of the villages had problems relating to drinking water. Another problem which the district is faced with is that villages are thinly populated and the average distance between villages is very high. The master plan thus considered only those villages which had a minimum population of one hundred persons. The master plan proposed to cover 304 problematic villages by providing 44 rural Regional Water Supply Schemes for them. Besides this, four pump and tank schemes were prepared to cover 4 villages and 14 extensions to cover another 44 villages. 135 villages had already been covered at the time the master plan was made. This left 396 villages. For them 25 skeleton water supply schemes were proposed.

By March 1980 there were 20 Regional Water Supply Schemes, 19 Pump and Tank schemes, 6 piped water supply schemes and 5 tubewell schemes in the district from which a total number of 216 villages had benefited. During 1981-82 it was proposed to cover another 78 villages through Rural Water Supply (24 schemes), Pump and tank (3 schemes) and hand pump (5 schemes) schemes. The towns of Barmar and Balotra both have protracted water supply schemes.

This still leaves slightly over 50 per cent of the villages as problematic. Thus there is considerable work left to be done in this area particularly because drinking water poses a very serious problem during summer and drought periods when human and livestock population is forced to migrate outside the district.

Chapter-VIII

SUMMARY AND CONCLUSIONS

Barmer has desert type sandy soil since a large portion of the district comes under the Thar desert. The average annual rainfall is low and erratic. The rate of evaporation is high as a consequence of high temperature during summer months. As a result wells tend to dry up during summer. Out migration of both human beings as well as animals is a common feature during periods of water scarcity. These adverse natural conditions make Barmer drought prone and the frequency of droughts is rather high.

Agriculture is the mainstay of the people but is highly subsistence oriented. Natural conditions act as a major constraint to agricultural development. Ground Water resources are the main source of irrigation but its estimates have not been properly assessed. There are, however, indications that there is a surplus which needs to be exploited properly. Although there has been a considerable increase in the irrigated area over the years, this increase could have been greater still had the surplus ground water reserves been properly tapped and effectively utilised. The depressed state of agriculture devoid of any dynamic elements is brought out by the low percentage of net sown area, heavy reliance on bajra and fodder crops and the low rates of average yield of almost all crops as compared to either the State or the Country.

Although agriculture is the primary occupation of the people it can not be relied upon exclusively for raising the levels of living of the people. Even if the existing ground water potential is fully tapped and effectively exploited, the soil conditions are bound to exert their influence on the level of agricultural productivity. It is, therefore, necessary to stress on agricultural improvement in those areas where soil conditions too are found suitable for bringing about an increase in per hectare productivity. For the remaining areas dry and arid farming techniques should be developed keeping in view the requirements of animal husbandry and the resource based industries. At the same time one has to think in terms of alternative sectors which can be developed so as to ease the burden on agriculture.

From this angle animal husbandry is one activity which offers some scope although it has been pointed out that water scarcity forces people to migrate out of the district along with their animals. The district has a very high livestock population comprising mainly of goats, sheep and milch cattle. Under the existing Integrated Rural Development Programmes in operation there are various schemes for the provision of milch cattle, goats and sheep on a loan-cum-subsidy basis. In 1980-81 for instance nearly 900 families benefited through these schemes. What is equally important is that the district

authorities should also take the necessary follow up measures as well like the provision of animal feed at reasonable rates all around the year. At the same time better veterinary services will have to be provided. The cooperative sector too can play a significant role in the promotion of animal husbandry. They can be suitably developed such that the marketing of the produce of the animal husbandry sector like milk and milk products, wool etc. can be channelised through cooperatives.

Of the other natural resources a few mineral deposits call for proper exploitation. The district is rich in clay so there is scope for the development of the pottery industry particularly in areas where sufficient water is available. Similarly, the district also has large deposits of bentonite and salenite which are not being fully exploited at present.

While the district has a low industrial base there are, however, substantial small scale and cottage industries in Barmer. These units registered a fairly high growth between 1971-1981. This is a good sign from the point of view of providing an alternative to agriculture. Most of these units are resource based and for their sustained development it is imperative that raw material supplies are both adequate and regular. Any short-fall in local availability should be made good through outside purchase. Another aspect that which

has not received serious attention of the authorities so far as that no serious efforts have been made to improve the production process in the traditional industries.

Although no large or medium scale industries exist at present a few, particularly resource based, could be established. The industries that come to mind are the leather and leather products industry which at present are found in the small scale sector alone. With a large livestock population availability of raw material is no problem. Similarly a few bone meal units could also be established. Even the woolen units can be started in the large scale sector. In the food products group a milk and milk products unit can likewise be taken up in the large scale sector. In case entrepreneurs are unwilling to come forward the Government should undertake these projects in the public sector.

One of the obvious reasons for the lack of industrial activity is the inadequate development of infrastructure facilities in the district. Adequate attention has to be paid for the development of power in particular if the industrial sector is to be properly developed.

An overview of the situation suggests that water is an obvious constraint in the economic development since such a high proportion is dependent on agriculture. The inadequate

development of water resources also affects the livestock population as well which suggests that ground water development should be the primary concern of the authorities.

It is observed that there is a very high degree of complementarity between agriculture, animal husbandry and industry. However, the techno organisational integration between these key sectors is at a rather low level. Consequently, the level of productivity is also low. Under the existing circumstances one can not visualise very dramatic changes that can be brought about to speed up the process of development of Barmer. What is of primary importance is that the techno organisational set up be suitably improved such that it can be operated at a higher level. Agriculture, therefore, needs to be suitably developed keeping in view the requirements of both animal husbandry and industries. Animal husbandry needs to be given the proper impetus such that it can sustain the population dependent on it and provide the industries based on it. Similarly, the government, at the outset, should concentrate on the development of the resource based industries. In this way the productivity level of the key sectors can be raised thereby improving the level of living of the people in general. Having achieved this much, the government can then think in terms of establishing modern industries in large and small scale sectors. For this however, proper planning will have to be done.